

# CORNELL UNIVERSITY OFFICIAL PUBLICATION

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ANNOUNCEMENT OF THE  
TWENTY-SIXTH SUMMER SESSION  
JULY 9—AUGUST 17  
1917

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This announcement is intended to give detailed information to prospective students in the Summer Session of Cornell University.

For general information concerning the University and the work in its various colleges during the academic year, the requirements for admission, etc., the General Circular of Information should be consulted. This and the other publications of Cornell University are listed on the last page of the cover of this pamphlet. Any one of the informational publications there mentioned will be sent gratis and post-free on application to the Secretary of Cornell University, Ithaca, New York.

## CALENDAR

### SUMMER SESSION 1917

In order to get the full number of exercises announced for the Summer Session, it is necessary that all work begin promptly on Tuesday morning, July 10. Students are, therefore, urged to reach Ithaca in time to be present at the first exercise in each class. If possible, they should register on Monday, July 9; if not, they should register on Tuesday during the hours not occupied in class work.

July 9, Monday,	10 a. m. to 5 p. m. Registration at office of Registrar.
July 10, Tuesday,	Instruction begins at times and places announced under each course. Registration continued.
July 10, Tuesday evening, and following Tuesdays,	Musical Recital, Sage Chapel.
July 11, Wednesday evening, and following Wednesdays,	Departmental Conferences. Pianoforte Lecture-Recital by Mr. E. R. Krøger, Barnes Hall.
July 14, Saturday, before 1 P. M.	Last day for payment of fees at the Treasurer's Office, 1 Morrill Hall.
July 15, Sunday evening, and following Sundays,	Organ Recital. Bailey Hall.
July 16, Monday evening,	First lecture in Monday evening course. Continued on following Mondays. Rockefeller Hall.
August 10, 11, Thursday and Friday,	New York State Examinations for Teacher's Certificates.
August 17, Friday,	Summer Session closes.

# CORNELL UNIVERSITY, SUMMER SESSION 1917

## OFFICERS

Jacob Gould Schurman, LL.D., President of the University.  
George Prentice Bristol, A.M., Director of the Summer Session.  
David Fletcher Hoy, M.S., Registrar of the University.

## \*STAFF OF INSTRUCTION

Ross Peter Anderson, Ph.D., Assistant Professor in Chemistry.	Chemistry
Ruth Atkinson, Instructor in Physical Training.	Physical Education
Elmer J. Bailey, Ph.D., Assistant Professor of English.	English
Dane Lewis Baldwin, M.A., Instructor in English.	English
William C. Ballard, M.E., Instructor in Engineering.	Music
Leila Bartholomew, Teacher of Music, Grammar Schools, Ithaca.	Music
Robert Bartholomew, Assistant in Music.	Music
Charles Clarence Bidwell, Ph.D., Instructor in Physics.	Physics
Homer Guy Bishop, M.A., Assistant in Psychology.	Psychology
Sophia W. Bliven,	Music
Albert William Boesche, Ph.D., Professor of German.	German
Edwin Garrigues Boring, Ph.D., Instructor in Psychology.	Psychology
Julian Pleasant Bretz, Ph.D., Professor of American History.	History and Government
George Prentice Bristol, A.M., Professor of Greek.	Linguistics
Leslie Nathan Broughton, Ph.D., Assistant Professor of English.	English
Thomas Benjamin Brown, A.B., Instructor in Physics.	Physics
Arthur Wesley Browne, Ph.D., Professor of Chemistry.	Chemistry
William Benjamin Buck, Assistant in Wood Shop.	Manual Training
Earle Nelson Burrows, C.E., Assistant Professor of Civil Engineering.	Engineering
Walter H. Butterfield, Director of Music, Manchester, N. H.	Music
Clayton Joseph Buttery, A.B., Instructor in Romance Languages.	French
James McFadden Carpenter, A.B., Instructor in Romance Languages.	French
Walter Buckingham Carver, Ph.D., Assistant Professor of Mathematics.	Mathematics
Frederick D. Cheydleur, Dr. ès Lettres, Instructor in French, Williams College.	French
Hamlin E. Cogswell, Mus.M., Supervisor of Music, Washington, D. C.	Music
Lane Cooper, Ph.D., Professor of English.	English
Clyde Firman Craig, Ph.D., Assistant Professor of Mathematics.	Mathematics
Margaret Cramer, Teacher of Rhythm and Folk Dancing in Public Schools, Rochester.	Physical Education
Charles Henry Cunningham, Ph.D.	South America
Karl M. Dallenbach, Ph.D., Instructor in Psychology.	Psychology
Hollis Dann, Mus.D., Professor of Music.	Music
Herbert Joseph Davenport, Ph.D., Professor of Economics.	Economics
Hermann C. Davidsen, Ph.D., Assistant Professor of German.	German
Alexander M. Drummond, A.M., Assistant Professor of Public Speaking.	Public Speaking
Charles Love Durham, Ph.D., Professor of Latin.	Latin
Ellsworth David Elston, A.B., Instructor in Physical Geography.	Physical Geography
Archibald M. Erskine, B.Chem., Assistant in Chemistry.	Chemistry
Donald English, Ph.D., Assistant Professor of Economics.	Economics
Georgia Everest, Supervisor of General Art, Pratt Institute, Brooklyn.	Drawing and Art
Edwin George Fleming, A.B., Assistant in Public Speaking.	Public Speaking
William Silliman Foster, Ph.D., Assistant Professor of Education.	Education

\*The names of the instructors in the College of Agriculture are given on page 56.



## SUMMER SESSION

- Jean Marius Gelas, Instructor in U. S. Military Academy, West Point. Physical Training
- Frederick R. Georgia, B.Chem., Instructor in Chemistry. Chemistry
- Roswell Clifton Gibbs, Ph.D., Assistant Professor of Physics. Physics
- Raleigh Gilchrist, A.B., Assistant in Chemistry. Chemistry
- David Clinton Gillespie, Ph.D., Assistant Professor of Mathematics. Mathematics
- J. Earl Griffith, Head of Department of Drawing and Art, Central High School, Newark, N. J. Drawing and Art
- Clarence Walter Ham, M.E., Assistant Professor of Machine Design. Industrial Education
- Genevieve Henry, Director of Girls Physical Education, High School of Commerce, Cleveland. Physical Education
- William H. Hoerrner, Professor of Music, Colgate University. Music
- Leroy Hooper, Foreman of Pattern Shop. Manual Training
- Helen Allen Hunt, Teacher of Music, Boston, Mass. Music
- Wallie Abraham Hurwitz, Ph.D., Assistant Professor of Mathematics. Mathematics
- Stuart Deming Jackson, A.B., Assistant in Chemistry. Chemistry
- Arthur Edward Johnstone, Teacher of Music, New York City. Music
- Johannes B. E. Jonas, Ph.D., Head of German Department, DeWitt Clinton High School, New York City. German
- Dexter Simpson Kimball, M.E., Professor of Machine Design and Industrial Engineering. Industrial Education
- Ernest R. Krøger, Teacher of Music, St. Louis, Mo. Music
- Joseph Peter Koller, B.Chem., Assistant in Chemistry. Chemistry
- George A. Land, Ph.D., Teacher of Latin in the Lawrenceville School. Latin
- Lida J. Low, Teacher of Voice, Boston. Music
- Gustav Ernst Lundell, Ph.D., Assistant Professor of Chemistry. Chemistry
- William Edward Lunt, Ph.D., Professor of English History. English History
- Joseph V. McKelvey, Ph.D., Instructor in Mathematics. Mathematics
- Asa Emanuel McKinney, A.M., Assistant in Chemistry. Chemistry
- Samuel Arthur Mahood, M.A., Instructor in Chemistry. Chemistry
- James Frederick Mason, Ph.D., Professor of Romance Languages. French
- David E. Mattern, A.B., Teacher of Music, Ithaca Schools. Music
- Edith H. Matzke, M.D., Adviser of Women. Hygiene
- Daniel Chauncey McCoy, Assistant in Chemistry. Chemistry
- Victor Elvert Monnett, A.B., Assistant Professor of Geology, University of Oklahoma. Geology
- Benton Sullivan Monroe, Ph.D., Assistant Professor of English. English
- Marcel Moraud, Bachelier-ès Lettres, Instructor, Princeton University. French
- Carleton Chase Murdock, B.S., Instructor in Physics. Physics
- Guy Brooks Muchmore, A.B., Assistant Professor of Public Speaking. Public Speaking
- Albert T. Olmstead, Ph.D., Associate Professor of History, University of Missouri. History
- Robert M. Ogden, Ph.D., Professor of Education. Education
- William Ridgley Orndorff, Ph.D., Professor of Organic and Physiological Chemistry. Chemistry
- Frederick William Owens, Ph.D., Assistant Professor of Mathematics. Mathematics
- Miles Albion Pond, Ph.B., Assistant Professor of Civil Engineering. Descriptive Geometry
- Paul Russel Pope, Ph.D., Professor of German. German
- Harry Payne Reeves, A.M., Associate Professor of Romance Languages, Ohio Wesleyan University. Spanish
- Harold Lyle Reed, Ph.D., Assistant Professor of Economics. Economics
- James T. Quarles, A. A. G. O., University Organist and Assistant Professor of Music. Music



Ernest William Rettger, Ph.D., Assistant Professor of Applied Mechanics.	Mechanics
Fred Hoffmann Rhodes, Ph.D., Instructor in Chemistry.	Chemistry
Floyd Karker Richtmyer, Ph.D., Assistant Professor of Physics.	Physics
Guillermo Rivera, A.M., Instructor in Spanish, Harvard University.	Spanish
Burton T. Scales, M.A., Director of Music, Girard College.	Music
Francis Joseph Seery, B.M.S., Assistant Professor of Civil Engineering.	Hydraulics
Francis Robert Sharpe, Ph.D., Assistant Professor of Mathematics.	Mathematics
John Sandford Shearer, Ph.D., Professor of Physics.	Physics
Alice Sheffer, Principal Fall Creek School, Ithaca.	Music
Louis L. Silverman, Ph.D., Instructor in Mathematics.	Mathematics
Virgil Snyder, Ph.D., Professor of Mathematics.	Mathematics
Katharine Starkey, M.D.	Physical Education
Edith M. Stone, Director of Music in Public Schools, Jackson, Michigan.	Music
William Strunk, jr., Professor of English.	English
James Sullivan, Ph.D., State Historian and Director of the Division of History of New York State Education Department.	History
Leonard C. Urquhart, C.E., Instructor in Civil Engineering.	Engineering
Oscar Diedrich von Engeln, Ph.D., Assistant Professor of Physical Geography.	Geography
Albert Edward Wells, Professor of Machine Construction.	Industrial Education
Thomas Whitney Benson Welsh, Ph.D., Instructor in Chemistry.	Chemistry
Bernice White, Instructor in Music, Normal College, New York City.	Music
E. Jane Wisenall, Teacher of Music in High Schools, Cincinnati, Ohio.	Music
Harry Elmsley Wood, Director of Manual Training, Indianapolis, Ind.	Industrial Education
William K. Wright, Ph.D., Assistant Professor of Philosophy, Dartmouth College.	Philosophy
Wesley Daniel Zinnecker, Ph.D., Instructor in German.	German

### OBJECT OF THE SUMMER SESSION

The primary object of the Summer Session is to advance education by helping those engaged in it. The instruction is adapted to the needs of the following classes:

1. Professors and teachers in colleges and schools, superintendents, and supervisors of special branches of instruction.

The announcements of the different departments show a wide range of work. This work is either advanced and, therefore, suited for specialists who wish to pursue their individual study, or more elementary and adapted to teachers who desire to start in a new field. In addition to the instruction of the class room, the University's libraries, laboratories, and shops are open for use. For superintendents and supervisors, there are also courses in administration, and in general and special methods, besides lectures on educational philosophy and theory.

2. College students in Cornell or other universities who wish to use some of the "long vacation." In the case of graduates some of the work offered may be counted toward an advanced degree. Undergraduates may anticipate work and thereby shorten their course, or may make up existing deficiencies. The conditions for receiving credit, and the amount which may be obtained, are stated on pages 8 and 9.

3. Students entering the University and wishing to obtain surplus credit at entrance, or to complete the entrance requirements. It often happens that students have in June more or less than the requirements for admission to college. The Summer Session affords them the opportunity either to add to their surplus and thus, in some cases, to gain a year in time; or to make up their deficiency.

4. All persons qualified to pursue with profit any course given, whether or not they are engaged in formal study or teaching.

### STATISTICS OF ATTENDANCE, 1916

The whole number enrolled in the Summer Session of 1916 was 1628 (685 men and 943 women). Of this number 484 were students during the previous winter; 744 were persons engaged in teaching, of whom 34 were teachers in colleges, 10 in normal schools, 242 in high schools, 327 in grammar schools, 45 in private schools, and 86 were supervisors or superintendents.

### ADMISSION, ATTENDANCE, REGISTRATION

There is no examination for admission to the Summer Session. For conditions of admission to courses in the College of Agriculture, see page 58. Each person must, however, satisfy the instructor in charge of any course (unless it be elementary) that he is qualified to pursue the work. Any duly registered student of the Summer Session may visit such classes as he desires. Admission to the class rooms is restricted to duly registered students. Persons wishing to have work done during the Summer Session counted towards a degree, must conform to the regulations stated under the heading "Credit for Work," page 8.

All students are required to register at the office of the Registrar in Morrill Hall. They may register on Monday, July 9, between 10 a. m. and 5 p. m., or upon the day of their arrival, if they reach Ithaca later than July 9. Regis-



tration on July 9 is urged. Class exercises begin at 8 a. m., Tuesday, July 10th. The Registrar's office is open from 9 a. m. to 4 p. m. every day except Saturday, when it is closed at noon.

Students who wish credit for graduate work must register also with the Dean of the Graduate School at his office, Room 22, Morrill Hall.

### REGISTRATION FEE

A registration fee of \$5 will be charged each student who registers for the first time in the Summer Session. This will be paid only once. Registration in a second year or in subsequent years will be without this fee. Matriculated students are not exempted from paying it on their first registration in the Summer session. This fee will be collected with the tuition.

### TUITION FEE

The single tuition fee, with the exceptions noted below, for the entire Summer Session, whether one course or more is taken, is \$30. This must be paid at the office of the Treasurer, Room 1, Morrill Hall, within five days after registration day. In case of withdrawal within five days from the first registration day, for reasons satisfactory to the Treasurer and the Registrar, the tuition paid may be refunded and the charge cancelled. In case of withdrawal within two weeks after the first registration day, one-half the tuition may be refunded. In case of registration after the first three weeks of the session, students must pay two-thirds of the full tuition fee. No student is admitted without the payment of this fee. Sibley College students taking shopwork are not exempted. Admission to classes is restricted to duly registered students.

For instruction in swimming and fencing an extra fee is charged. See p. 14.

Tuition in all subjects taught in the College of Agriculture, is provided by the State of New York, and is free to *students registered therein who are residents of this State*. For all others the charge is the same as for other work, \$30. Free tuition does not include any instruction outside the College of Agriculture, nor are students receiving free tuition permitted to attend classes outside the College of Agriculture.

On payment of \$30 tuition fee a person may take work in both the College of Agriculture and any other department.

### LABORATORY FEES

**Chemistry.** A fee is charged for material actually consumed, and such deposit must be made with the Treasurer as the instructor may prescribe.

**Physics.** In this department the fee is at the rate of \$1 for every five hours a week of work in the laboratory. The entire amount must be paid to the Treasurer at the beginning of the session.

**Geography and Geology.** In courses B and D in geography a fee of \$1 each must be paid in advance to the Treasurer to cover incidental expenses of the course.



**Shopwork.** The fee for shopwork is at the rate of \$1.50 for every fifty hours spent in the shops. This must be paid in advance to the Treasurer. Students registered in Sibley College during the previous year are not required to pay this fee.

**Library Deposit.** See under Library, page 10.

### ACADEMIC CREDIT FOR WORK

**In the College of Arts and Sciences.** The requirements for the degree of Bachelor of Arts are residence for eight terms (four years), and the completion of one hundred twenty hours ("points") of elective work. A student who has satisfied the entrance requirements of the College, and has afterward completed in two or more Summer Sessions at least twelve hours of work in courses approved by the departments concerned, may be regarded as having thus satisfied one term of residence. Under no circumstances shall work done in Summer Sessions be accepted as the equivalent of more than two terms of residence. The maximum amount of credit towards the A.B. degree which is allowed for the work of any one Summer Session is eight hours. In order to receive credit towards the A.B. a student must pass at least five hours, and must secure in advance the approval of the Dean for his choice of studies.

**In Other Colleges of the University.** The nature and amount of credit allowed in these for Summer Session work may be learned from the statements under the announcement of each course.

**In the Graduate School.** Graduate work at Cornell is not expressed in terms of courses or hours. A graduate of any college whose requirements for a first degree are substantially equivalent to those for the first degree at Cornell may be admitted to resident study in the Graduate School. He may be admitted to candidacy for an advanced degree upon the recommendation of the professors under whom he proposes to work. The conferring of the degree itself does not depend primarily on the completion of any prescribed number of courses or of a fixed term of residence. It involves the writing of a thesis and the passing of a special final examination. The minimum period of residence for the Master's degree is one academic year or its equivalent, and for the Doctor's degree three years.

Not all work done by a graduate student is graduate work in the strict sense of the term. Graduate work to be considered as work for a degree must be of advanced character in some field or department of knowledge. No credit for residence towards a master's degree will be granted any student who does not register with the Dean of the Graduate School within three days after the opening of the Session, and who does not formally become a candidate for this degree under the direction of a special committee. The latest day for such registration in 1917 will be July 12.

The residence requirements for the degree of Master of Arts may be fulfilled in whole or in part by attendance during the Summer Session of the University. For this purpose, two Summer Sessions will be regarded as the equivalent of one term, and four Summer Sessions as the equivalent of one year. Candidates for this degree who are in residence during Summer Sessions only are also required

to continue their studies during the year under the direction of the chairman of the special committee in charge of their work.

The graduate work offered in the summer of 1917 may be learned from the departmental announcements. Not all departments offer graduate work.

Any person wishing to become a candidate for an advanced degree and to study during the Summer Session should write to the professor whose work he expects to take, and also to the Dean of the Graduate School, asking for a blank form of application for admission to the Graduate School. It is much better to make these arrangements before coming to Ithaca, thus avoiding delay and interruption of study after the Summer Session has begun.

*In order to secure credit for graduate work done in the Summer Session a student must register with the Dean of the Graduate School, Room 22, Morrill Hall, not later than Thursday, July 12.*

**Certificates for Work Done.** Students of the Summer Session who are not matriculated in the University may receive certificates of attendance and of work satisfactorily performed. Application for them must be made before August 17, and the applicant must leave at the office of the Registrar a large-sized envelope stamped and directed to his home address. The certificate will then be forwarded by mail. The regulations of each department for the granting of a certificate must be met.

### COST OF LIVING

The cost of board and furnished room in Ithaca during the Summer Session runs from \$7 a week upwards. In some cases the cost has been reduced to \$6, but it is not safe to count upon less than this sum.

The price of a single furnished room may be as low as \$2.00 a week. The prices advance with the size and location of the rooms.

Rooms are engaged with the understanding that they will be occupied for the entire session, unless otherwise agreed upon by both parties. Table board is usually engaged by the week, or, if so stated, by the day.

A list of desirable rooms in private houses may be had on application after June 1st. Students are cautioned against unauthorized rooming house agents.

The price of table board runs from \$4.50 to \$6 in boarding houses. In cafeterias and restaurants, the average cost of meals would amount to about the same sum.

### RESIDENTIAL HALLS—ROOMS—BOARD

1. **For Women.** The University has three residential halls for women in which board and rooms may be obtained during the Summer Session by registered students only.

Rooms in these buildings will be reserved in the order of application. Each application for a room must be accompanied by a deposit of \$5.00; otherwise the application will not be entered. If the room assigned is occupied by the applicant the amount of this deposit is held until the end of the session to cover the return of keys, damage to building or furniture other than the ordinary wear and tear, and to insure the completion of the lease. The deposit is refunded if the applicant gives formal notice to the manager on or before June 15 that she wishes to withdraw her application.



In Sage College, which accommodates 175, the charge for room, table board, and a specified amount of laundry, will be, for the session, from \$52 to \$64 according to the size and location of the room.

In Prudence Risley Hall, which accommodates 151, the charge will be from \$58 to \$61 according to the room occupied.

In both buildings this charge includes lodging Friday night, July 6 (not earlier), breakfast Saturday, July 7, and all meals to and including breakfast Saturday, August 18.

Members of the Summer Session who do not room in Sage College or Prudence Risley Hall may obtain table board at either. The charge is \$5.75 per week.

In Cascadilla Hall a furnished room may be had for the six weeks of the Summer Session at a cost of \$18 to \$24. This building is furnished like the others but has shower baths and not tubs. In this building the University maintains a cafeteria restaurant where meals may be had at very reasonable rates.

2. **For Men.** Founders Hall, one of the new group of residence halls, is available for men students.

For room plans and all information relative to these halls, apply to Thomas Tree, Manager of Residential Halls, Sage College, Ithaca, N. Y. Checks for reservation of room, or in payment of board bills, should be drawn to the order of Cornell University.

### THE LIBRARIES

The University Library is open on week days from 9 a. m. to 10 p. m., except Saturday, when it is closed at 1 p. m. In this are located the main library, containing about four hundred thousand volumes, and most of the seminary and special libraries. The main reading room affords accommodations for over two hundred readers, and contains a selected library of over 8,000 volumes of reference works. Adjacent to it is the periodical room in which are kept the current numbers of about five hundred journals in various fields of knowledge. These rooms are open to all students. Students properly qualified are allowed the use of the seminary rooms and of the books in them. The main collection is primarily a library of reference for use in the building. Students are, however, to a limited extent, allowed to take out books for home use. Persons wishing this privilege must make a deposit of \$5, which will be refunded upon the return of all books taken out.

The Library of the College of Agriculture, in the basement of the Agronomy building, is open on week days from 9 a. m. to 5 p. m., except Saturday, when it is closed at 1 p. m. In it will be found a large collection of bulletins and reports of experiment stations, reference books on agriculture and country life, agricultural periodicals, and the like. The entomological library, in the Department of Entomology on the fourth floor of the main building, is one of the most complete of its kind in the United States. Nearly all the departments in which instruction is given have well-selected departmental libraries.

### LECTURES, MUSICAL RECITALS, EXCURSIONS

In addition to the regular class room work there will be public lectures on Monday evenings. In 1917 these lectures will treat of some recent discoveries in science and their applications, and also of South America.



There are also lectures of general interest each week in connection with the various departments. Notice of these will be given in the University Calendar.

Musical recitals will be given on Tuesday and Sunday evenings alternately in the Sage Chapel and Bailey Hall, and piano recitals on Wednesday in Barnes Hall.

Wednesday evenings are devoted to the departmental conferences which are open to all interested. Notice of these will be given from week to week.

In connection with the work of several departments excursions are made to many points of interest. Some of these are open to members of the Summer Session. Notable for their attraction are the excursions to Watkins Glen and to Niagara Falls.

### RAILROAD ROUTES AND RATES

Ithaca is reached by either the Lehigh Valley or the Lackawanna railroad. By the latter, a branch leaves the main line at Owego. Through trains run from New York and Buffalo on the Lehigh, and through sleeping cars run daily from New York on both roads. From Philadelphia, and from Baltimore, Washington, and the South via the Baltimore & Ohio, the Philadelphia & Reading connects with the Lehigh at Bethlehem. On the Lehigh, through trains for Ithaca connect with the New York Central at Auburn, and with the Pennsylvania (Northern Central) and the Erie at Elmira.

From some important points in the Middle and Atlantic Coast States summer excursion tickets may be purchased to Ithaca. From central and western states it may be possible to buy excursion tickets to Niagara Falls, in case an excursion rate to Ithaca is not available.

Persons interested should, some time in advance of their departure, make inquiry of the railroad agent at their home town. If full information cannot be obtained in this way, write to the Director of the Summer Session, Ithaca, New York.

## COURSES OF INSTRUCTION

Most of the courses offered consist of five exercises a week, each week day except Saturday. The number of actual hours of class work in any course may be found by multiplying the number of weekly exercises by six.

The word "hour" used in speaking of University credit means the equivalent of one class exercise a week for a half year or one semester. One hundred and twenty such "hours" are required of candidates for the A.B. degree.

(G. S. = Goldwin Smith Hall.)

## EDUCATION

Courses A, B, and C, will be found especially helpful to college graduates who are preparing for examinations in professional subjects as outlined in the New York State Syllabus and Course of Study for the renewal of the College Graduate Certificate Limited. The State Education Department will hold an official examination for such candidates at Ithaca, August 10 and 11. Since it is permissible to do so, those who can should prepare for examination in two subjects this summer and for the remaining two a year later.

**A. Educational Psychology.** Professor OGDEN. Daily except Sat., 9. Goldwin Smith 256. Credit, two hours.

A study of the learning process and its application to educational theory and practice: the original nature of man, reflex action and instinct; the acquisition of habits; attention, memory, association and thinking; fatigue, individual differences and social cooperation. The text-book used in this course will be Colvin's *The Learning Process*.

**B. Principles of Education.** Professor OGDEN. Daily except Sat., 11. Goldwin Smith 256. Credit, two hours.

The nature and significance of education; biological and psychological foundations; the school as a social institution; educational ideals and values; the curriculum, administration and general methods. The text-book used in this course will be Ruediger's *Principles of Education*.

**C. History of Education.** Lectures, recitations, and prescribed readings. Assistant Professor FOSTER. Daily, except Sat., 10. G. S. 256. Credit, two hours.

The purpose of this course is to give an understanding of present educational values and practices through an historical consideration of their origin and development. Throughout the course, therefore, attempt will be made not only to outline the problems and their solutions, but to correlate education with the life and the social, psychological, and economic conditions of the times. Only such theories and practices as later proved themselves influential will be considered.

The topics treated are to a great extent those emphasized in the syllabus for the New York State Teacher's Certificate: education in primitive and barbaric societies; Greek and Roman education; the rise of the school as an institution;



scholasticism, humanism, and realism; the rise of science; the 'psychological' movement; the origin and nature of specifically modern tendencies in education.

Text-book: Graves' *Student's History of Education*.

**D. The Technology of Memory and Learning.** Lectures, recitations, and prescribed readings. Assistant Professor FOSTER. M W F, 12. G. S. 256. Credit, one hour.

This course deals with the nature of memory as a mental function, and the practical principles and rules determined by experimental results.

The chief topics which will be treated are: the general nature of memory; its relation to other mental functions; the learning curve in animals and man; the conditions of impression, association, retention, recall and recognition; unusual memorial abilities and their conditions; the application of the above results to the questions of efficient study; the formation and breaking of habits; reviews and 'cramming'; recitation and examination; teaching and the presentation of material; mnemonic schemes and the 'training of memory'. Demonstrations and class experiments will be frequently made. Several reports upon assigned readings will be required.

**E. Mental Tests.** Lectures, and prescribed reading. Assistant Professor FOSTER. T Th, 12. G. S. 256. Credit, one hour.

A general consideration of the psychology and the practice of mental tests. The lectures will deal with the historical development of tests, the principles underlying their formation and application; the single tests and the test-systems; the bearing of tests upon the problems of psychological theory (nature and distribution of intelligence, the correlation of abilities, etc.); the use of tests in the schools, and for the diagnosis of insanity, defective and exceptional abilities, the selection of vocation, educational measurement, and the like.

Group experiments will be frequently performed, and the results worked out by the class. Reading and report upon a topic of special interest to the individual student will ordinarily be required, but laboratory work at a special afternoon hour to be arranged may be substituted therefor if a sufficient number request it.

## HYGIENE, FIRST AID, SCHOOL INSPECTION

**A. Personal Hygiene, First Aid, Home Nursing.** The right use and proper care of the human mechanism; health habits; the sense organs; the nervous system; the contributing causes of poor health; the carriers of disease; the prevention of bacterial and of degenerate diseases.

The lectures on first aid and home nursing will follow the plan of the American Red Cross Society. Daily except Sat., 11. Stimson Hall. Dr. MATZKE.

**B. School Hygiene and School Inspection.** The course will afford practical assistance to all teachers in securing and maintaining the hygienic conditions for instruction recommended by the Physical Training Commission and the New York State Education Department. The lectures will follow the State syllabus of October, 1916. The course will include also a consideration of health and sanitary inspection of the class room; the appointment and duties of pupil health officers and pupil sanitary inspectors; inspection for signs of abnormality, and injury or illness, for conditions which call for immediate attention on the part of



the teacher, and for signs of disordered health for which children should be kept at home; the detection of defective sight or hearing. Daily except Sat., 12. Stimson Hall, Dr. MATZKE.

**Physical Examinations and Personal Conferences.** A physical examination is offered every woman student entering the Summer Session for the first time. Individual appointments will be made for consultation and examination at the office of the Medical Adviser of Women in Sage College. Consultations are open to all women registered in the Summer Session. Doctors MATZKE and STARKEY.

### PHYSICAL EDUCATION FOR WOMEN

A. **Gymnastics: School Room and Playground.** Practical work in free-hand exercises and light apparatus; the arrangement of material; classification of pupils; methods of teaching and of commanding; progression; practice teaching. Daily except Sat., hour to be arranged. Sage Gymnasium. Misses ATKINSON and HENRY. Credit, one hour for A and one other course.

B. **Organization and Administration of Playgrounds.** Selection and classification of games. Daily except Sat., hour to be arranged. Sage Gymnasium. Misses ATKINSON and HENRY. Credit, one hour for B and one other course.

C. **Singing Games, Elementary Folk and Aesthetic Dancing.** Selected and graded list of simpler dances suitable for class room and playground. Daily except Sat., hour to be arranged. Sage Gymnasium. Misses ATKINSON and CRAMER. Credit, one hour for C and one other course.

D. **Folk and Aesthetic Dancing. Advanced Course.** For teachers and others who have already some proficiency in this work. Daily except Sat., hour to be arranged. Misses ATKINSON and CRAMER. Credit, for D and one other course one hour.

Students taking any of these courses should provide themselves with suitable costume—gymnasium shoes and bloomer suits, or bloomers and middie blouse, with black stockings.

#### E. **Swimming and Fencing.**

Instruction in swimming and life saving; and in fencing for individual training and for teaching will be given at hours to be arranged for each applicant by appointment.

For this instruction a special charge is made: for swimming, \$10; for fencing, \$5, including outfit.

Gymnasium costume and slippers (without heels) will be advisable for fencing.

For women, Sage College Gymnasium. 10-12 a. m. 3-6 p. m. For men, Armory Gymnasium, by appointment. Mr. GELAS.

### INDUSTRIAL EDUCATION

Industrial education means more than the mere teaching of shopwork and drawing. It suggests a scheme of education which will make it worth while for all children to remain in school, and which will provide for the children of the masses and for those who enter the great manufacturing and constructive industries something equivalent to what the state is doing for those who enter the professional and managing activities of the country.

The University offers in the Summer Session courses in education, handwork, and drawing.

**Equipment.** The shops and drawing rooms of Sibley College are among the largest and best equipped in the country. They are being used regularly by 1200 students and can accommodate 1500. They are at the disposal of the students of the Summer Session, who have the further advantage of seeing the regular instruction given to Sibley College students. They include a machine shop, a foundry, a blacksmith shop, a woodworking shop, and many drawing rooms, lecture rooms, etc. The shops are exceptionally well supplied with machines and tools for complete instruction in the various subjects.

A portion of the equipment has been rearranged and adapted for the special needs of teachers of manual training, drawing, and arts and crafts.

The shops and drawing rooms are open daily (until noon on Saturday). The lectures for this department are given between the hours of 12 and 1 every day except Saturday. The University Library is available for reading and original work by students who desire to examine the books, pamphlets, and reports referred to in the lectures and conferences.

It is believed that some knowledge of the principles of education, a definite understanding of tool processes, and the ability to express ideas adequately through the art of drawing are the professional qualifications which make for efficient teaching of subject matter coming under the head of industrial education. With this aim the department offers three definite courses of instruction: 1. Education; 2. Handwork; 3. Drawing.

**A. Problems of Industrial Education.** Lectures and conferences. Daily except Sat., 12-1. G. S. 142. Professor KIMBALL, and others.

A discussion of the development of industry and the rise of manufacturing methods, with particular reference to the effect of the same on education. Manufacturing methods have changed so radically and have influenced our educational outlook to such an extent that teachers of all branches of industrial education, and no less all supervising officers, need some knowledge of these matters if they are to attempt to prepare young people for industry.

The first part of the course deals, therefore, with the industrial background and the problems on which modern industrial education must be based. Among the topics treated will be the influence of machinery, in general, upon manufacturing methods, the economic problems of production and the related problems of factory legislation and factory welfare work.

In the latter part of the course a survey will be made of the several methods by which modern educators have endeavored to meet these new industrial conditions educationally and of the efforts that are being made by private interests through independent schools and through schools closely identified with industry. Messrs. WOOD and GRIFFITH who are members of the staff will give a number of illustrated lectures showing the work of several large city school systems and the work will be further supplemented by lectures drawn from various educational activities where these problems are being considered.

**B. Manual Training for the Lower Grades.** A course of handwork adapted to the first six years of the elementary school. No set course of study in handwork suitable for this grade will be given, but instead the various materials, suit-



able for elementary handwork will be made use of and the various methods by which problems can be made will be discussed, demonstrated and used. This will enable those taking the course to have a large variety of experiences and will equip them with such first-hand information as will make them well fitted to select the type of work best suited to the special communities in which they work. In the lessons on stenciling, for example, instead of giving a problem in stenciling of the general type, there will be discussions, demonstrations and practice in stenciling by the direct method, by the indirect method; with water dyes, with spirit dyes, with water colors, with oil paints, and with crayons; by brush method, by spray method; on paper, textiles, and wall surfaces. There also will be given an opportunity to carry out a definite problem with the processes and material best suited to the individual's needs. Work in stick printing, block printing, construction in paper and cardboard, weaving, reed and raffia work, book binding, blue printing and Vandyke printing, thin wood work, and chair caning will be handled in a similar manner in order that it may meet the particular needs of the regular grade teacher, be of help to the special teacher of art and manual training who wishes to become familiar with the problem of handwork in the elementary grades, or of aid to the craft worker who wishes to broaden his experience. Daily except Sat., 2-4. Mr. WOOD.

**C. Wood Work for Pre-vocational and Junior High Schools.** This is a course employing a comprehensive set of bench tools adapted to the upper grades of the grammar schools. Each model is considered with reference to form, fitness, and decoration. Methods of presentation and execution. This course is intended to equip a capable but inexperienced person for a position as teacher. Daily, 8-11. Mr. HOOPER.

**D. Wood Working for Secondary Schools.** A course which aims to prepare for the teaching of wood work in the secondary schools. It includes the study of joinery, furniture, making structural design, and decoration. Concrete problems involving the principles of the work will be suggested by the teacher and carried out by the class. The individual will have considerable latitude in the choice of the particular project and in its design and decoration. Particular attention will be paid to design. Daily except Sat., 2-5. Mr. HOOPER.

**E. Shop Lectures and Conferences.** Lectures and conferences on the organization and supervision of manual training, methods, materials, equipments, costs, and courses of study; also practical talks and demonstrations on subjects of importance to the manual training teacher, such as woods and wood construction, lumber and forestry, wood finishing, etc. T Th, 4-5. Mr. WOOD.

**F. Foundry Work for Secondary and Trade Schools.** The course begins with instruction in tempering the sand and making green sand moulds for small work. Following this come exercises in core making, and an explanation of loam work. Machine, floor, and sweep mouldings are briefly described. Castings are made in cast iron, and the students are taught to operate the cupola furnace.

*This course will not be given unless a sufficient number apply to Professor Kimball on or before July 7.*

**G. Forging for Secondary and Trade Schools.** Systematic instruction in the use of each tool as it is taken up, the study of each material worked, with an explanation of its various grades, the proper method of treatment for each, and



the discussion of the methods of making large forgings. The ground covered includes instruction in the building and care of fires, heating, drawing, forming, bending and twisting, upsetting, upsetting while bending, upsetting for square corners, punching, bolt making, welding, including careful instruction in scarfing for the various welds, the making and use of heading tools, chain making, the making and fitting of braces, the construction of hooks and ring bolts, riveting, and the use of threading tools. Training is also given in the use of the power hammer. The work in steel includes drawing, forming, welding, and tempering, and spring and tool making.

This course will not be given unless a sufficient number apply to Professor Kimball on or before July 8.

**H. Machine Work for Secondary and Trade Schools.** The different measuring tools and devices, with the advantages, methods of use, and limits of accuracy of each are considered. Each cutting tool is taken up, its cutting angles and general adjustments are discussed, together with the feeds and cutting speeds suitable for each material worked and for each machine. The course includes instruction in centering, squaring, straight and taper turning and fitting, outside and inside screw cutting, chucking, reaming, finishing and polishing, drilling, tapping, mandrel making, grinding and lapping, boring, brass turning and finishing, ornamental turning, planing flat and V surfaces, fitting, the use of the milling machine, gear cutting, tool making, including taps, drills, reamers, milling cutters, and cylindrical gauges. Mr. WELLS and Mr. BUCK.

**J. Freehand Drawing for Elementary and Secondary Schools.** A course to meet the needs of the public school teacher. A complete course of study, in detail, from the first grade through high school is first considered. Then each subject of that course is carefully developed and worked out. This will include methods of drawing in such phases of the subject as the teacher must meet and in the common mediums such as pencil, water color, crayon, and charcoal. Theory and practice will be closely correlated. The study of design and color, perspective, and the pose, for their public school value, combined with talks on methods of presenting these subjects receive thorough attention. Sketching from nature, including out-of-door work for characteristic growth of trees, forms a part of the course. The relation of art to hand work is considered and the study of design is made applicable to constructive problems. Daily except Sat., 9-12. University credit, two hours. Sibley 208. Mr. GRIFFITH and Miss EVEREST.

Although the above course forms a complete unit in itself, the following course is designed as supplementary.

**K. Design, Fine and Applied Art.** (Open only to students who have completed course J or its equivalent.) Design is considered from a more advanced point of view and applied to color problems, book plates, title pages, constructive problems, printing, and the like. Stenciling and block printing on velvets and other textiles together with the introduction of interwoven silk on these textiles will be taught; also leather tooling and coloring of leather. Advanced out-of-door sketching will supplement that started in course nine. Manuscript printing, done direct with quill or lettering pen together with illumination will be considered as outgrowths of the study of printing. Costume design and household decoration, as far as they are applicable to the grammar or the high

school, will be considered in their application. Throughout the course illustrated lectures to develop art appreciation will be given. All subjects will be considered from the standpoint of both the secondary and the more advanced schools. A small laboratory fee (not to exceed one or two dollars) will be charged, to cover cost of material furnished. Daily except Sat., 8-11. Sibley 202. University credit, two hours. Mr. GRIFFITH and Miss EVEREST.

Students who have completed courses J and K may continue their study, if so desired.

**L. Mechanical Drawing for Secondary Schools.** This course is designed for those who wish to teach mechanical drawing in secondary schools and for those who feel the need of a more complete knowledge of this subject to assist them in teaching shop work. Some of the topics covered are use of instruments, lettering, orthographic and isometric projection, inking, tracing, conventions, and working drawings. Students familiar with these topics may elect a more advanced course. Sibley 102. Assistant Professor HAM.

## PSYCHOLOGY

**A. Introduction to Psychology.** Goldwin Smith Room C. Credit, two hours. Lectures: Daily except Sat., 9. Dr. BORING.

This course furnishes a general introduction to the study of the normal human mind from the experimental point of view. It opens with a brief discussion of the nature of a "scientific" psychology, of the problems which such a psychology is called upon to face, and of the methods at its disposal for their solution. It then sets forth in order the facts and laws of mental life as indicated by experiment, beginning with sensation, image, and affection; it passes by way of attention, perception, association, and memory to the highly complex processes of imagination, voluntary action, and thought. Throughout the work use will be made of the unique collection of demonstrational apparatus which composes the equipment of a special laboratory in Goldwin Smith Hall. The beginning student is thus enabled to confirm in his own experience the statements made in the textbook and in the lectures.

Readings will be prescribed in Titchener's *Beginner's Psychology*. Supplementary readings in Titchener's *Textbook of Psychology* will be recommended to members of the class who desire to pursue more intensive study.

**B. The Psychology of Attention: Theoretical and Practical.** Goldwin Smith Room C. Credit, one hour. T Th, 11. Dr. DALLENBACH.

A series of lectures upon the psychology of attention and its meaning in everyday life. Emphasis will be placed upon the practical bearings of the subject. The course will begin with a preliminary study of the phenomena comprising the development, the conditions, the kinds and the levels of attention. The experimental investigations will then be taken up, after which the application of the laws of attention to the psychology of advertising, to the psychology of conjuring and prestidigitation, to testimony, to efficiency, to learning, etc., will be considered. The course will be illustrated by diagrams and charts. No textbook will be used. Readings will, however, be assigned in Titchener's *Textbook of Psychology*, and other standard texts to be found in the library. No prerequisites are required.



**C. The Psychology of the Unusual Mind.** G. S. Room C. Credit, one hour. M W F, 11. Dr. BORING.

Primarily a lecture course. No knowledge of psychology is presupposed. Emphasis will be laid upon the relation of the abnormal to the normal mind and upon the occurrence of the abnormal in every day life. The lectures will treat of the minds of exceptional and defective persons, including the feeble-minded, prodigies and geniuses; of mental derangements, such as hallucinations, illusions, hysteria, sleep, dreams, and hypnotism; and a brief survey will be made of the disorders of sensation, perception, feeling, and memory, occurring in the insanities. The presentation will be as systematic as possible, and will seek always to distinguish between the observed fact and its theoretical interpretation.

**D. Introductory Laboratory.** Psychological Laboratory. Morrill Hall. Credit, two hours. M W F, 2.00-4.30. Drs. BORING, DALLENBACH, and Mr. BISHOP.

The purpose of this course is to furnish the student training in psychological method, and to give him a first-hand acquaintance with the contents of his own mind. The laboratory consists of twenty-seven rooms on the upper floors of Morrill Hall, including dark rooms, workshops, and offices. The equipment on the side of apparatus is especially complete, embracing besides the standard pieces for qualitative experiments a great variety of special instruments. The equipment of the research laboratory is also available for demonstrations. Experiments will be performed in vision, audition, and the other departments of sense, in feeling, attention, perception, and idea, and toward the end of the work the student may carry out experiments upon the more complex processes of association and action. The textbook is Titchener's *Experimental Psychology*, vol. i, *Qualitative Student's Manual*.

**E. Quantitative Laboratory.** Psychological Laboratory, Morrill Hall. Credit, two hours. M W F, 2.00-4.30. Drs. BORING, DALLENBACH, and Mr. BISHOP.

This course aims to furnish such training in the psychophysical methods and in the handling of instruments of precision as will be adequate preparation for research problems. The student will make experimental determinations of the stimulus limens, will attempt verifications of Weber's Law in various departments of sense, and will perform at least one experiment by each one of the chief psychophysical methods. Quantitative experiments in special fields may be undertaken in so far as time permits. The text-book is Titchener's *Experimental Psychology*, vol. ii, *Quantitative Student's Manual*.

Laboratory partnerships must be formed if the work of this course is to be pursued with profit. If, therefore, a partner cannot be found, the student is recommended to register in course F.

**F. Advanced Work in Psychology.** Psychological Laboratory, Morrill Hall. Hours and credit to be arranged. Drs. BORING and DALLENBACH.

As a prerequisite for this course, Course D or its equivalent is necessary. The work may consist either of essays and reports upon some special topic, or of laboratory practice at a higher level than that of Course D.

**PHILOSOPHY**

**A. History of Modern Philosophy.** Daily except Sat., 9. G. S. 227. Credit, two hours. Assistant Professor WRIGHT.

A series of lectures and informal discussions furnishing an outline of the history of philosophical thought during the modern period; the various movements and systems interpreted in relation to scientific, literary, social, religious, and educational tendencies contemporary with them. Emphasis will be placed upon the philosophers of the more brilliant periods, such as the Renaissance and Enlightenment, and some notice will be given to the changed logical and ethical standpoints that have arisen in recent times in consequence of the doctrine of evolution, and of altered social and economic conditions. Readings will be assigned in the standard histories of philosophy, and in the writings of the philosophers themselves, to be found in the Library, and no regular text-book will be used. The preparation of a paper on some special topic will be required of those who take the course for credit. No prerequisites.

**B. Philosophy and Psychology of Religion.** Daily except Sat., 12. G. S. 227. Credit, two hours. Assistant Professor WRIGHT.

This course will begin with a series of lectures upon some of the more important phases of contemporary individual and social religious experience, interpreted in the light of the psychology of adolescence, the sub-conscious, and the rise and development of social and moral self-consciousness in the individual. The practical significance of these phases of religious experience for the work of teachers and of religious and social workers will be considered. The latter part of the course will be more narrowly philosophical, and will treat of the nature and objective validity of such postulates of religious faith as a moral world order, immortality, and God. No prerequisites. Some collateral reading and the preparation of a paper, will be required of those who take the course for credit.

[**C. Practical Problems in Social and Political Morals.** Daily except Sat., Credit, two hours.] Not given in 1917.

While the above courses are primarily for undergraduates, they may also be taken by graduate students, who, if credit is desired, will be expected to undertake additional reading of a more advanced character, and to prepare a special paper under the supervision of the instructor. Arrangement will be made by the instructor for occasional personal conferences with graduate students regarding their work.

**ENGLISH**

**A. Composition.** Daily except Sat., 8. G. S. 156. Credit, two hours. Mr. BALDWIN.

A practical drill intended for those who lack proficiency in writing: frequent short themes and several longer papers, expository, descriptive, and narrative; discussion of the elements and forms of discourse; weekly personal conferences at hours to be appointed. This course and course B (see below), taken together, will be considered the equivalent of the first term of course 1, or course 3, in the regular University session.

**B. Introductory Course in Literature.** Daily except Sat., 9. G. S. 164. Credit, two hours. Assistant Professor BROUGHTON.



A study of Tennyson and Browning with special attention to the *Idyls of the King* and the *Ring and the Book*.

This course and course A (see above), taken together, will be considered the equivalent of the first term of course 1, or course 3, in the regular University session. Texts: Oxford editions.

**C. Shakespeare.** Daily except Sat., 10. G. S. 156. Credit two hours. Mr. BALDWIN.

Designed mainly for high school teachers of English. A study of three or four of the greater tragedies, with comment on textual difficulties and discussion of important problems of character and plot. Stress will be laid on one play, the choice of which will depend on the preference of the class. Text: Bradley's *Shakespearean Tragedy*.

**D. Modern English Grammar.** Daily except Sat., 8. G. S. 142. Credit, one hour. Assistant Professor BAILEY.

A study of the grammatical structure of the modern English sentence, with special reference to the textbooks ordinarily used in primary and secondary schools. Discussion of the terminology adopted in recent treatises, consideration of problems in sentence structure, and drill in syntax. Credit gained in this course may not be used to meet the underclass English and history requirement in the University. Text: Leonard's *Grammar and its Reasons*.

**E. An Introduction to Modern English Poetry.** Daily except Sat., 9. G. S. 162. Credit, two hours. Professor COOPER.

A brief survey of the literary and historical background; rapid reading in two or more of the chief English poets of the Nineteenth Century (as Wordsworth and Coleridge); an intensive study of one poem (to be chosen after consultation with the class); the aim being to show how a teacher should study such masterpieces as are included in the College Entrance Requirements in English.

**F. Advanced Composition and Style.** Daily except Sat., 10. G. S. 164. Credit, two hours. Assistant Professor MONROE.

A course intended for students who have had course A or its equivalent and for persons of some maturity who wish further training in expression. A rapid review of the principles of writing; study and discussion of some modern prose, in connection with representative essays on the theory of style. Regular practice in composition. Personal conferences at hours to be appointed.

**G. English Usage and Style.** Except Sat., 11. G. S. 160. Credit, two hours. Professor STRUNK.

A study of the theory of good English, with practical exercises. The principles by which English usage is determined; matters of dispute in vocabulary and grammar; common errors; revision of manuscript; proof-reading; the larger questions of style and diction. Open to teachers, and to students who have had two years of college English or its equivalent.

**H. Teachers' Course.** Daily except Sat., 9. G. S. 156. Credit, two hours. Assistant Professor BAILEY.

Designed for those who are teaching English, or who expect to teach the subject. Methods of treating the novels, the poems, and the essays named by the Conference on Uniform Entrance Requirements in English; discussion of related topics in composition.

**K. American Literature.** Daily except Sat., 12. G. S. 156. Credit, two hours. Assistant Professor BROUGHTON.

A study of the American poets of the nineteenth century with particular attention to Bryant, Poe, Whittier, Longfellow, Lowell, Holmes, and Emerson. Text: Page's Chief American Poets.

**L. The English Language.** Daily except Sat., 12. G. S. 164. Credit, two hours. Assistant Professor MONROE.

A study of some significant features in the growth and development of the mother-tongue. Language and grammar. The relationships of English. Phonetics, with practical exercises. The English vocabulary. Inflections. Native resources and foreign influences. The bearing of historical grammar on modern forms and usages, written and spoken.

Recitations, lectures, collateral reading. The course does not require previous knowledge of Old or Middle English.

**M. Methods and Aims in the Study of Literature.** Daily, except Sat., 11. G. S. 162. Credit, two hours. Professor COOPER.

A study of the principles of literary art in connection with the reading of masterpieces in standard editions of the chief English poets and in the best English translations from other literatures. Some attention will be given to the poetry of the Bible. The first book employed will be Cooper's *Methods and Aims in the Study of Literature* (Ginn); other books will be recommended, and advice will be given for the guidance of the student in his subsequent reading and teaching.

One hour in the week (Mon., 11) will be devoted to the interpretation by the instructor of some leading English poet.

**N. Recent English Poetry.** Daily except Sat., 10. G. S. 160. Credit, two hours. Professor STRUNK.

A study of the poetical work of Robert Bridges (the classic tradition of English poetry), Rudyard Kipling (the romance of the modern world; imperialism), and W. B. Yeats (neo-romanticism; the Celtic revival); together with an examination of representative poems from the anthology, *Poets of To-Day* (Sidgwick and Jackson, Ltd.).

**O. Old English.** Daily except S., 11. G. S. 167. Credit, two hours. Assistant Professor MONROE.

This course is intended for students who, lacking the opportunity hitherto, now wish by earnest effort to acquire some knowledge of English in its early form. Lessons in grammar are followed as soon as possible by the reading of easy prose of the time of Alfred the Great.

The course may be taken by undergraduates; and, with additional reading, by graduates as a part of their work for the master's degree.

### PUBLIC SPEAKING—ORAL ENGLISH

In all the courses described below, individual instruction will be given by appointment. In this way the particular needs of each student, however varied they may be, can be met. No fees will be charged for this special instruction.



**A. Public Speaking.** Daily except Sat., 11. G. S. 21. Credit, two hours. Assistant Professor DRUMMOND and Mr. FLEMMING.

A practical training for speaking in public. Original speeches and selections; extemporaneous speeches. Methods of preparing will be discussed and illustrated. High school teachers will find the methods applicable to their work. Regular students passing this course will be admitted to the work of the second term in Public Speaking, course 1.

**B. Voice Training.** Daily except Sat., 8. G. S. 21. Credit, one hour. Special work may be arranged with the instructor for one hour additional credit. Assistant Professor MUCHMORE.

This course consists of exercises, both physical and mental, for the development of pure tone, flexibility, melody and strength of voice, clear enunciation, and for relief from high, strained tones, harshness, throatiness, and speakers' sore-throat. Private appointments will be given each student, in which the voice will be tested, and, if needed, special exercises prescribed. The course necessarily includes training for poise and ease of action. The relation of the voice in conversation, teaching, and public speaking to health is emphasized.

**D. Oral Reading.** Daily except Sat., 10. G. S. 21. Credit, two hours. Assistant Professor MUCHMORE.

This course is designed especially to help teachers of literature, but is open to all students. The first part of the course will be devoted to the elements of reading: attention, individualization, and sequence of ideas. The second part will be given to the oral interpretation of literature, with special emphasis on the spirit rather than the form. Each member of the class will receive private appointments, and will prepare individually at least one selection. Regular students who pass this course will be admitted to the second term in Oral Reading, course 10.

**E. The Production of School Plays.** M W F, 9. G. S. 26. Credit, one hour. Consent of instructor necessary for admission. Assistant Professor DRUMMOND.

The course is intended to give teachers sufficient knowledge of play-production to meet the growing demand in the schools for dramatics that have an educational value. There will be consideration of choice of plays, elements of training, staging of plays, and other practical phases of production. Reading of plays to insure sufficient familiarity with suitable dramatic literature will be required. One act plays will be rehearsed.

The Campus Theatre and the equipment of the Cornell Dramatic Club will be available for illustration and practical use.

## FRENCH

Courses A, B, C, afford the student an opportunity of gaining a working knowledge of French and also a chance to make a rapid review of the subject. The other courses are intended for teachers and graduate students. The members of the Department will be very glad to supervise the work of graduate students in any special field of investigation.

**A. First Year French.** Grammar, reading, composition, and conversation. Daily except Sat., 8 and 12. G. S. 283. Professor MASON. University credit, four hours. Entrance credit, one unit.

The object of this course is two-fold: first, to give beginners a thorough drill in the essentials of French pronunciation, grammar, and reading; second, to offer to teachers an opportunity to study the methods of presentation of these subjects to beginners. By supplementary reading after the Summer Session the beginner can prepare himself for the fall examinations in Second Year French.

**B. Second Year French.** Grammar review and reading. Daily except Sat., 8 and 12. G. S. 281. Mr. BUTTERY.

University credit, four hours. Entrance credit, one unit.

**C. Third Year French.** Daily except Sat., 8 and 12. G. S. 277. University credit, four hours. Entrance credit, one unit. Mr. CHEYDLEUR.

**D. Advanced Composition and Conversation.** Daily except Sat., 9. G. S. 283. Mr. MORAUD. Credit, two hours.

**F. History of French Literature.** Lectures in French. Outside reading and reports. Daily except Sat., 11. G. S. 283. Mr. MORAUD. Credit, two hours.

**G. Old French Texts.** Daily except Sat., 10. French Seminary Room, Library. Mr. CHEYDLEUR. Credit, two hours. Prerequisite course E. (Elementary French Philology.)

A literary study of selected Old French texts, such as *la Vie de Saint Alexis*, *Aucassin et Nicolette*, *le Voyage de Charlemagne*, *Erec et Enide*, *Yvain*. Students who elect this course are expected to devote their entire time to it. This course will probably be given in alternate years.

## SPANISH

**A. First Year Spanish.** Grammar, pronunciation, composition, translation. Wagner's Spanish Grammar. Daily except Sat., 8 and 12. G. S. 225. Associate Professor REEVES. University credit, four hours. Entrance credit, one unit.

The object of this course is to afford to those who have had no Spanish an opportunity to acquire the essentials of the grammar, to lay the foundations for the spoken and written use of the language, and to learn to translate easy Spanish readily.

**B. Second Year Spanish.** Grammar review, conversation, composition, reading. Coester's Spanish Grammar. Daily except Sat., 8 and 12. G. S. 126. Mr. CARPENTER. University credit, four hours. Entrance credit, one unit.

This course will be conducted, as far as feasible, in Spanish.

**C. Third Year Spanish.** Composition, translation and reading of modern authors. Daily except Sat., 8 and 12. G. S. 221. Mr. RIVERA. University credit, four hours. Entrance credit, one unit.

Open also to those who have had one year of college Spanish. Especial emphasis will be laid on modern Spanish idioms and on the accurate rendition of prose and verse into English. The course will be conducted in Spanish.



**D. Spanish Composition and Conversation.** Daily except Sat., 11. G. S. 221. Mr. CARPENTER. University credit, two hours.

Intended for students who have had at least two years of preparatory school Spanish or one year of college Spanish and who desire further practise in correspondence and in the oral use of the language. It may be profitably taken in connection with Course C. The course will be conducted largely in Spanish.

**E. Spanish Commercial Correspondence.** Daily except Sat., 9. G. S. 282. Mr. RIVERA. University credit, two hours.

For students who have had experience in Spanish Composition. Special emphasis will be laid on the forms of business letters, advertisement and circular writing, and the drawing up of commercial papers. The course will be conducted in Spanish.

Frequent talks and lectures in Spanish on subjects of Hispanic interest will be given during the session by members of the department.

## GERMAN

Courses A, B, C, afford the earnest worker an opportunity to gain a working knowledge of German by highly concentrated effort, and a chance to make a rapid review of previous reading.

The other courses are intended for teachers and for students of considerable proficiency in the subject. They present opportunity for advanced study in language, grammar, and literature, and also are intended to give direct practical assistance in all the various problems, which confront the teacher. Students are urged and encouraged in every possible way to use German in and out of the class room.

**A. First Year German.** Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. G. S. 183. Professor POPE. University credit, four hours. Entrance credit, one unit.

This course affords an opportunity for those who have had no German to acquire a practical working vocabulary, to master the essentials of grammar, to learn to read easy German, and to begin conversational work in the language. As far as possible the language of the class room will be German. Two recitations will be held daily except Saturday with sufficient time between the two for the preparation of the second lesson. Textbook: Zinnecker's "Deutsch für Anfänger." After successfully completing this course, students can, by supplementary reading during the summer, prepare themselves for the fall entrance examination in second year German, or they may take the second year German course during the first term of the regular college year. Dr. POPE will be in Room 182, T Th, 9, to give special assistance to members of this class.

This course also affords teachers of German an opportunity for observation of methods of teaching.

**B. Second Year German.** Oral and written use of the language based on the reading of German texts. Review of important topics of grammar in connection with the reading. Two recitations will be held daily except Saturday with sufficient time between the two for the preparation of the second lesson. Textbooks: Storm's "Immensee" (ed. by Elmer & Neumarker, Chas. E. Merrill Co.),

Hillern, "Höher als die Kirche" (ed. Jonas, Allyn and Bacon), and Ball's German Drill Book.

Prerequisite: one year of high school German or its equivalent. Those who do not present certificates showing the completion of one year's work in German will be required to take a test at the beginning of the course. This course is equivalent to the second year of high school German and its completion entitles the student to a second unit of entrance credit in German. University credit, four hours. Daily except Sat., 8 and 12. G. S. 177. Dr. JONAS. The instructor will be in room 178, T Th, 9, to afford special assistance to members of this course.

**C. Third Year German.** Oral training, grammar composition, reading. Two recitations a day will be held, with a sufficient interval to enable the student to prepare for the second recitation. Text-books: Gronow, Geschichte, und Sage; Leander; Traumereien; Riehl, Burg Neideck; Freytag's "Die Journalisten." Prerequisite: two years of high school German or its equivalent. The completion of this course entitles the student to the third unit of entrance credit in German. Daily, 8 and 12. G. S. 134. Dr. ZINNECKER. University credit, five hours.

The instructor may be consulted T Th, 9, in room 178.

[**Advanced Course in Modern German Grammar.** The aim of this course is entirely practical. It is intended to serve the need of teachers of German who feel that without a thorough and fairly scientific knowledge of grammar there can be no competent teaching of its elements. The most troublesome and important questions in modern German accidence and syntax will be discussed with greater thoroughness than is found in even the larger general works on the subject. The inflection of pronouns and adjectives, the use of cases, the employment of haben and sein as auxiliaries, the subjunctive, moods and tenses in indirect discourse, and the order of words will be among the topics treated.] Not given in 1917.

**D. History of the German Language.** Daily except Sat., 11. G. S. 236. Professor BOESCHE. Credit, two hours.

A study of the development of modern German with constant attention to the practical needs of teachers. The course aims particularly at the explanation of modern German accidence and syntax in the light of our knowledge of past stages of the language.

**E. Advanced Composition and Conversation.** Daily except Sat., 8. G. S. 190. Assistant Professor DAVIDSEN. Credit, two hours. This course will aim to train the students to write and to speak correct German. It will be conducted in German. Papers, based upon pictures and works of literature discussed orally in class, will be handed in regularly and corrected by the teacher. A few extra hours will be set aside for instruction in elementary phonetics.

[**Studies in the Style and Technique of the Nineteenth Century Prose Writers.** Assistant Professor DAVIDSEN.] Not given in 1917.

[**Comparative Studies in the German Drama.** Assistant Professor DAVIDSEN.] Not given in 1917.



**F. Lessing. An Introduction to Classical German Literature.** Daily except Sat., 9. G. S. 183. Assistant Professor DAVIDSEN. Credit, two hours. Lectures, one a week, and recitations will be in German. A study and discussion of Lessing's early poems, epigrams, and dramas; Miss Sara Sampson, Minna, Emilia, Nathan, and parts of the *Literaturbriefe*, the *Hamburgische Dramaturgie*, and *Laokoon*.

Students are advised to provide themselves with some edition of Lessing although texts will be obtainable in Ithaca.

[**Lessing's Life, Writings, and Influence.** Professor BOESCHE. This course will deal chiefly with Lessing, the revolutionizing critic and "liberator". A fair degree of fluency in reading German will be presumed. Any edition of Lessing's works may be used. A good low priced edition will be obtainable in Ithaca.] Not given in 1917.

**G. Goethe's Faust. Parts I and II.** Daily except Sat., 12. G. S. 236. Professor BOESCHE. Credit, two hours. The sources and the genesis of the drama will be studied but the course will primarily be devoted to a running commentary on the complete text, including the whole of the second part. Thomas's edition will be used.

[**Life and Works of Schiller.**] Not given in 1917. May be expected in 1918.

**H. Training Course for Teachers.** Daily except Sat., 10. G. S. 190. Dr. JONAS. Credit, two hours, with an extra hour for work assigned.

The aim of this course is to aid the teacher of modern foreign languages in the practical solution of class room problems by a study and demonstration of methods used by progressive teachers in Europe and in this country.

Among the topics to be treated are the following: a brief history of the teaching of German in the United States; the Report of the Committee of Twelve; the reform movement in the teaching of foreign languages in Germany and other European countries; the educational value of German; the aim of the teaching of German in the high school; the question of introducing German into our elementary schools; syllabus of a four-year high school course; the bearing of certain results of modern psychology on the instruction in modern languages; the place of phonetics; standard pronunciation; the inductive method of teaching grammar; the treatment of special topics in grammar and syntax; drill and habit-formation; "living" grammar; the Gouin method; a study and review of grammars and beginners books, and of text editions; use of connected texts and of detached sentences in elementary language work; the relation of oral work to written exercises; the building up of a vocabulary; the amount and proper selection of reading matter for the different years of the course; the place of translation in connection with reading; reading without translation; dramatization of stories; the treatment of poems; the historical and geographical background of the reading matter, leading to a sympathetic understanding of the life of the German people; the use of pictures and other illustrative materials; formal prose composition and free composition; the use of German journals and magazines; helpful adjuncts to class room work, such as the use of a pupil's library, a German "Verein," and international pupils' correspondence; the preparation of the teacher and aids to self-improvement.

The New York State Syllabus, the requirements of the College Entrance Examination Board, and the present syllabi for the teaching of modern foreign languages in the elementary and high schools of the city of New York will also be studied.

In order to help the teacher in the selection of textbooks to be used with beginners, an exhibit of the most recent grammars and elementary readers will be made, and a number of these will be critically studied by the students.

**J. Middle High German.** Daily except Sat., 11. G. S. 183. Professor POPE. Credit, two hours.

This course is intended to enable the student to read mediæval German literature in its original form, to give him the historical point of view in dealing with modern German grammar, and to serve as an introduction to the study of Germanic philology. Selections from the Nibelungenlied, from the court epics, and a number of the poems of the minnesingers, especially Walther von der Vogelweide, will be read. The grammatical treatment will constantly have in mind the explanation of modern German and is intended to serve the practical needs of teachers.

Textbooks: Pauls *Mittelhochdeutsche Grammatik*; Bachmanns *Mittelhochdeutsches Lesebuch*.

[Richard Wagner. Professor POPE. Lectures in English on Wagner's theory of the music drama, the sources of his operas, his place in German literatures and music, and his influence on modern culture, with illustrative recitals.] Not given in 1917.

## LATIN

The courses in Latin during the Summer Session are intended primarily for teachers and prospective teachers in secondary schools.

Courses A and B will have direct bearing on the work of the schools, and will be under the charge of a teacher who has had experience in the field of secondary instruction. Course C will be devoted to a theoretical consideration of the colloquial Latin. An advanced reading course, course D, will be devoted to some of the most important of the early sources of our knowledge of vulgar Latin.

Qualified students may begin or may continue their work in candidacy for the degree of master of arts, and courses C and D are reckoned as graduate courses for candidates for the degree A.M. Correspondence in advance concerning graduate work is invited, and prospective graduate students should confer with Professor Durham immediately after their arrival in Ithaca.

**A. The First Two Years of Latin.** Daily except Sat., 11. Goldwin Smith 128. Dr. LAND. Credit two hours.

This course is designed for those who intend to teach or are teaching Latin in secondary schools. Among the subjects to be considered are: The position of Latin in secondary education, its aims and purposes; how these aims and purposes are realized in the high school course; the relation of the first two years to the whole course; the ground to be covered in each year; methods to be used; the difficulties of the pupil; the difficulties of the teacher, as revealed by experiences of members of the class.



The course will consist of lectures and discussions. The literature of the subject will be studied and there will be reports by the different members of the class. This and the following course are designed to give a comprehensive treatment of the teaching of secondary Latin.

**B. Latin Composition.** Daily except Sat., 10. G. S. 128. Dr. LAND. Credit, two hours.

A course for teachers of Latin in the theory and practice of Latin composition and its teaching. The composition will be both oral and written, prepared and unprepared. The subject will be approached through the English, and emphasis will be placed on the translation of ideas rather than of words.

**C. Vulgar Latin.** The extension of the Latin language to the Roman provinces; the phonology, the flexions, the syntax, and the vocabulary of the colloquial Latin, its relation to the literary Latin of the classical period, and its connection with the Romance languages. Daily exc. Sat., 8 Goldwin Smith 128. Professor DURHAM.

**D. Petronius, Cena Trimalchionis; inscriptions of Pompeii, and early Christian and other vulgar Latin inscriptions.** A translation course dealing with some of the most important remains of the vulgar Latin. Daily exc. Sat., 9. Goldwin Smith 128. Professor DURHAM.

A series of conferences will be held, with practical exercises and systematic drill, on the pronunciation of Latin and on the reading of Latin prose and verse.

## RUSSIAN

A course in beginning Russian will be given if six or more students shall register for it with the Director of the Summer Session not later than July 1st.

## SCIENCE OF LANGUAGE

**A. Introduction to the Study of Language.** Daily except Saturday, 12. Goldwin Smith 128. Professor BRISTOL. Credit, two hours.

In this course the instructor will take up for discussion some of the underlying principles of all language phenomena with the special aim of illustrating facts and problems common to work in ancient and modern foreign tongues. The possibility of mutual assistance in language teaching will be constantly discussed, as well as uniformity in terminology. The course deals with comparative grammar only so far as the laws of this science explain phenomena which teachers are called on to treat and explain. Individual experiences of the class will be compared.

Graduate students may take this course as a part of work for the A.M. degree, if they make the request at the beginning of the course. A certain amount of reading in connection with the regular work will then be assigned them.

The following topics are likely to be the most essential to teachers in this field: The elements of phonetics; simplification of the confused phraseology now in use. Illustrations of these phenomena in English as a help to the teacher of foreign language. The resemblances and the differences in Latin, German and English forms and syntax. Linguistic relations between these languages. The different ways in which Latin has entered into the modern languages of Europe,

English in particular. The Greek in modern tongues. What is "life" in language? How are languages growing to-day? What shall the teacher say to new words? What is "translation," and how shall it be employed best in school? What should be the principal aim of language study in school?

## HISTORY AND GOVERNMENT

**A. American Government and Politics.** Daily except Sat., 8. G. S. 234. Credit, two hours. Professor BRETZ.

A study of the more important questions of government and politics at the present time. Among the topics discussed are the power of the courts to declare legislation unconstitutional and the problems arising from the exercise of that power; the amendment of constitutions, state and federal; citizenship and naturalization; the interpretation of the Fourteenth and Fifteenth Amendments; problems arising from our insular possessions; the treaty-making power of the United States; and other matters of current significance. While some attention will be paid to the structure of government the emphasis will be upon its operation. The work consists of reading specially assigned references and discussion in class.

**B. American History.** The expansion of the United States across the Alleghany Mountains, 1750-1848. Daily except Sat., 10. G. S. 234. Credit, two hours. Professor BRETZ.

This course deals with the exploration of the trans-Alleghany country, the movement of population into the West, Indian wars and relations with foreign powers on the frontier, territorial acquisitions, land policy, industrial development of typical communities, and in general with the social life of the new communities between the Alleghanies and the Mississippi. The plan is to supplement in some detail the customary treatment of American History and to emphasize the characteristic features of westward expansion.

**[American History. The Middle Period, 1815-1860.** Professor BRETZ.

A general course covering the principal topics in the period indicated. J. S. Bassett's Short History of the United States will be used as a text, and special use will be made of William E. Dodd's Expansion and Conflict.] Not given in 1917.

**[American History. The Period of Civil War and Reconstruction, 1850-1875.** Professor BRETZ. Not given in 1917.

A general course covering the more important issues in the period indicated. The best historical literature for the period will be pointed out and the results of the more recent study of the field will be indicated. The work of the course will consist chiefly of lectures with assigned reading.]

**C. Greek and Roman History.** Daily except Sat., 9. G. S. 134. Credit two hours. Professor OLMSTEAD.

A survey course, dealing with the most important phases of Greek and Roman civilization. Suitable for teachers who wish to review their ancient history. Special emphasis will be laid on those facts and interpretations which have not yet found a place in the current textbooks.

**D. The Near Eastern Question.** Daily except Sat., 11. Goldwin Smith 242. Credit, two hours. Professor OLMSTEAD.



The problem will be studied, not merely as an exercise in diplomacy, but rather as a phase in the interrelation of east and west. Special attention will be given to the fundamentals of the problem, such as the pre-Islamic background; Muhammad and his religion; Muslim theories of government, law, and finance; Muslim heresy and its influence on modern politics; the Crusades in their eastern relations; the recently discovered facts as to the early Turks; Constantinople as a world capital; the struggle of nationalism and imperialism, of Christianity and Islam; causes leading up to the present day position of Turkey and Persia. Each phase as discussed will be tied into modern conditions.

**E. English History to 1485.** Daily except Sat., 10. G. S. 242. Credit, two hours. Professor LUNT. A survey of the salient aspects of political, constitutional, economic, and social development. The lectures deal with the land and the people; the development of a Teutonic civilization; the changes wrought in the social and legal frame-work by the imposition of feudalism; the foundation of the English constitution; the gradual rise of representative institutions; the relations with the continent; the introduction and spread of Christianity; the growing power of the church and the conflict between church and state; life in town and country; the growth of commerce and industry and the rise of the middle class; intellectual currents and the birth of modern England.

**[F. English History, 1485-1916.** Professor LUNT.

A continuation of course E to the present. The lectures deal with the part played by England in the international rivalries of the sixteenth century, the reformation, the economic and social changes under the Tudors, the struggle between crown and parliament under the Stuarts, the foundation and expansion of the empire, the growth of cabinet government, the economic revolution, parliamentary reform, parties and politics, and other similar topics.] Not given in 1917.

**G. English History since 1815.** Daily except Sat., 9. G. S. 242. Credit, two hours. Professor LUNT.

The history of cabinets and parties, the development of the constitution, the social and economic changes, the foreign relations, and the relations with Ireland will be treated in the lectures with some fulness for the whole period. Other aspects of imperial history and colonial history will be touched upon only incidentally; but the instructor will be glad to arrange a systematic course of reading on these topics for students who may be interested. These aspects of the above topics will be studied among others: the political, social, and economic conditions at the close of the Napoleonic war; the great reforms, 1820-1850; the reconstruction of parties, 1846-1868; the foreign policies of Castlereagh, Canning and Palmerston, 1815-1866; the relations with Ireland, 1800-1868; the cabinets of Gladstone and Disraeli; the reforms of parliament; Irish home rule; the social legislation of the liberals, 1906-1914; the changes in foreign policy and the causes of the present war; and, if time permits, a brief view of contemporary English government.

The course is intended primarily for teachers of English history in secondary schools, for undergraduates and others who have already an elementary knowledge of English history, and for graduate students. It is the plan to arrange a series

of courses following this which will cover the whole period from 1485 to the present in the course of four summer sessions.

**H. Seminary in English History.** One two-hour session each week, at a time to be arranged. First meeting, Wednesday, July 11, 2-4 P. M. in the European Seminary Room of the University Library. Professor LUNT.

A course of research intended primarily for graduate students. The purpose is to give practice in the application of the principles of historical criticism in the medieval period and to study the problems which arise out of a chronicler's narrative. The work used this year will be the *Historia Maior* of Matthew Paris. The course is so organized that it may be taken in consecutive years without repetition of work. A reading knowledge of easy Latin is presumed.

**K. Latin America; Social, Political and Economic.** Daily except Saturday, 9. G. S. 234. Dr. CUNNINGHAM.

A general survey of Latin-America with reference to its history and civilization, institutions and racial strata and development, followed by an investigation of present-day conditions, political, social and economic; foreign influences in Latin America; relations with the United States and with Europe.

Students with a direct personal interest in this field specially if this lie in commerce are advised to consider course E in Spanish, page 25.

**L. Methods of Teaching History and Civics in the High School.** Daily except Sat., 11. G. S. 234. Credit, two hours. Dr. SULLIVAN.

The following topics will form the basis for lectures, reading, discussions, and reports: educational value and scope of history; the definition and aims of history teaching; relation of history to the other subjects of the curriculum, particularly geography; the use of the text-book; notebooks; notes and outlines; maps; charts; blackboard work; reference books and library work; sources; tests; examinations; reports; pictures; lantern slides; local history; lesson planning; reviews and criticisms of texts; elimination of the unimportant; curricula in history of typical general and special high schools in this country and Europe; reports of the Madison Conference, the Committees of Seven and Five of the American Historical Association; committees now at work; future tendencies; relation of history to civics and constitutional history; civics as a separate subject; report of the Committee of Five of the American Political Science Association; relation of the high school curricula to the elementary school curricula in history; report of the Committee of Eight; class room management in history; the preparation of the teacher; organization of subject matter; the recitation; departmental organization and teaching. The class will be organized in small groups for some practice teaching.

Bourne's *Teaching of History and Civics*, (Longmans); and Johnson's *Teaching of History* (Macmillan), should be in the hands of each student.

**M. Studies in Local History.** Daily except Sat., 12. Dr. SULLIVAN. Goldwin Smith 234. Credit, two hours.

New York State history will form the basis for the course. In addition to the running narrative, there will be studies drawn from various localities as illustrations of the way in which local history should be utilized. Teachers and students from neighboring states will be given studies taken from their own states and localities.



The best methods of teaching local history through the medium of the organization of city or local history clubs, patriotic societies, et cetera, will be described.

Those wishing to take the course must notify the instructor in advance, preferably immediately, but not later than June 1st.

Texts like Horne's or Prentice's *History of New York* and bibliographies for local history such as are published by the State Education Department; Williams' *A List of Books Relating to the History of the State of New York* and Flagg and Jennings', *Bibliography of New York Colonial History*, should be in the possession of students. Those from Pennsylvania should get the *Check List of Pennsylvania County, Town and Township Histories*, published by the Pennsylvania State Library; those from Massachusetts, Flagg's *Guide to Massachusetts Local History*, Salem Press; those from Connecticut, Flagg's *Reference List of Connecticut Local History* published by New York State Library.

## ECONOMICS

The following courses are designed to meet the needs of three classes of students in the Summer Session: (1) those desiring regular college credit for general economics; (2) students with special interests in economic subjects; (3) students seeking broad preparation for the teaching of economics in secondary schools. For the first group, Course A covers the subject matter usually included under elementary economics. For Cornell students Course A substitutes for both terms of Economics 52 and will also serve in lieu of Course 51 as a prerequisite to admission to various advanced courses in Economics. Graduate students wishing to pursue special investigations will be afforded assistance by members of the Summer Session staff of instruction, and by other members of the Department of Political Science of the University who may be in residence in Ithaca during the summer.

**A. Principles of Economics.** Twice daily except Sat., 11 and 12. G. S. 264. Credit, four hours. Professor DAVENPORT.

A general introduction to economics, covering the fundamental principles of value and the distribution of wealth, together with the elements of money and banking.

**B. Money and Banking.** Twice daily except Saturday, 10 and 11. Goldwin Smith 260. Credit, four hours. Assistant Professor REED.

A study of the principles governing the mechanism of exchange. The following topics will receive special attention: the theory of money and credit; the nature of banking operations; the effects of a changing price level upon investment operations; foreign and domestic exchange; the history of bimetallism in the United States; national and state banking systems; the Central Banks of Europe; American banking reform; financial readjustments occasioned by the European war.

**C. Elements of Accounting.** Daily except Saturday at 9. Goldwin Smith 264. Credit, two hours. Assistant Professor ENGLISH.

The theory of debit and credit in double entry bookkeeping; the classification of accounts; the construction and use of a simple accounting system; the preparation and interpretation of financial statements.

**D. Interpretation of Accounts.** Analysis of Income Sheets and of Balance Sheets. Daily except Sat., 8. Goldwin Smith 264. Credit, two hours. Assistant Professor ENGLISH.

A study of the financial reports of corporations, including a discussion of the issue of stocks and bonds, of the problems connected with the valuation of assets, and of the accounting requirements of the Interstate Commerce Commission.

## MUSIC

Students may be admitted to this department only upon special application in advance to Professor Hollis Dann. For conditions of admission, see the special announcement of the Department, which will be sent on application.

Admission of students in other departments of the Summer Session cannot be promised in advance, and is possible only to such classes as are not filled by the students taking Music exclusively.

First year courses are designated A. Second year courses are designated B. Third year courses are designated C. Fourth year courses are designated D. More advanced courses are designated E.

**Sight Reading—A.** This is an elementary course. For entrance the student must possess sufficient aptitude and ability to pursue the subject with profit, a singing voice of acceptable quality, and the ability to sing at sight familiar hymn and folk tunes.

In order to complete this course the student must be able to sing at sight individually, using the Latin syllables, music suitable for the first four years in the public schools.

Daily except Saturday, 10:15 and 12:15 Miss BARTHOLOMEW, Miss SHEFFER.

**Sight Reading—B.** This course requires singing at sight individually, with and without syllables, music suitable for the first seven years in the public schools.

Daily except Saturday, 12:15, (two sections), Mr. SCALES, Prof. HOERRNER.

**Sight Reading—C.** The student is required to sing at sight without accompaniment, reading words and music simultaneously, the music used in the upper grades of the public schools and in the high school, including music such as that found in *Art Songs* by Will Earhart. General review and individual singing of sequential studies. (See Dictation A and B).

University credit, one hour.

Daily except Saturday, 11:15, Mr. SCALES; 12:15, Mr. GOGSWELL.

Proficiency in sight singing is of great advantage to the student entering the Supervisor's Course. Skill in sight singing may be acquired through home study. New students who pass the sight reading courses upon entrance are thus enabled to concentrate upon other studies which cannot be pursued successfully at home.

**Dictation—A.** (Study of tone and rhythm). The subject matter of music is presented first to the sense of hearing. In this course the student gains the power to think tones and to sense rhythms and learns to recognize and write simple melodic phrases in all keys.

Each student is required to complete the oral and written dictation work of the first four years in music as outlined in the *Complete Manual for Teachers* by Hollis Dann, including singing from memory all sequential studies.



Daily except Saturday, 9:15, 10:15 and 12:15, Miss BARTHOLOMEW, Miss SHAFFER.

**Dictation—B.** This course deals with the problems of tone and rhythm included in the first seven years in the public schools.

Each student is required to complete the oral and written dictation, including all sequential studies, as outlined for the first seven years in *Complete Manual for Teachers*.

University credit, two hours.

Daily except Saturday, 9:15 and 10:15, Mr. BUTTERFIELD.

**Dictation—C.** This class completes the course in melodic dictation, covering the first 30 lessons of the Supplementary Material in *Complete Manual for Teachers*, pages 188 to 209. The course will also include Harmonic Dictation. Aural recognition of intervals and of chords in their fundamental and in verted positions in both major and minor tonalities.

University credit, two hours.

Daily except Saturday, 9:15, Miss WISENALL; Mr. 11:15, BUTTERFIELD.

These courses in ear training, together with the courses in sight reading, harmony and melody, give to the student a mastery of the elementary subject matter of music and constitute the fundamental training which is essential for advanced study.

The superiority of the best European schools of music over most American schools is largely due to the thorough three year course in sight singing and dictation which is required of every student. The student in harmony and counterpoint hears and visualizes the chord and the melody before he writes them; the orchestral player hears the tones and feels the rhythm of a difficult passage before he plays it; the singer likewise acquires the musicianship which is evidenced by his ability to read and write the language.

The power to read and write a language with facility is a prerequisite to any advanced study of its literature. This is as true of Music as it is of English or German. The proper place for this fundamental training is in the elementary and secondary schools.

Students planning to enter the course for supervisors should acquire some degree of proficiency in recognizing and taking down simple melodies, before making application for admission. For directions concerning home study, apply to the Principal of the Department of Music.

**Material and Methods—B.** This course is devoted to the study and demonstration of material and methods for the Kindergarten and first four years in music. Special attention is given to the selection, presentation, and interpretation of rote songs for the primary grades, the presentation of the different tonal and rhythmic problems as they are taken up in successive years, the selection and use of material for the different grades, etc.

University credit, two hours.

Daily except Saturday, 9:15 and 11:15, Miss WHITE.

**Material and Methods—C.** This course is open to students who have completed Material and Methods B, and is devoted to the teaching and supervising of music in the upper grades, from the fifth to the eighth, inclusive. The work of each year is taken up in detail and the problems which confront the grade teacher and supervisor are carefully considered.

University credit, two hours.

Daily except Saturday, 10:15, Professor DANN.

On Friday of each week at 10:15 the lesson in methods will consist of a demonstration with a class of children from the Ithaca public schools. Students will thus have the opportunity of observing the practical application of methods to classes of children representing the several grades in the public schools.

**High and Normal School Music—D.** This is an advanced course to which only fourth year and more advanced students are admitted. The many difficult problems which confront the music teacher in the high and normal schools are carefully studied.

Some of the topics for special consideration are: the school chorus, glee clubs, classification of voices, grading and classification of high school students in music, bibliography of choral music suitable for high and normal schools, preparation for teaching in normal and training schools, elective courses, credits for the study of music both in and outside of the high school, etc.

University credit, two hours.

Daily except Friday and Saturday, 12:15, Professor DANN.

**Practice Teaching—D.** Open to fourth year students only. Practical use of materials for all grades, and application of methods of teaching.

Each student will be given frequent opportunity for practice teaching under supervision of the instructor. Classes of children of different grades will be in attendance.

No student can complete the course for supervisors until he is able to demonstrate his mastery of the subject matter and methods by actual teaching. It is highly important that each student shall have had some experience in teaching in the public schools before entering this class. Previous experience in class teaching is invaluable and almost indispensable.

University credit, one hour.

Daily except Saturday, 9:15, and 10:15, Miss STONE.

**Harmony (Preparatory)—A.** This course provides instruction in the elements of music. The following are taken up for study: clefs, signification and origin; construction of major scale (without key-signature); normal harmonic and melodic minor scales; notation of chromatic scale with each key-signature; intervals, triads and their inversions.

New students are strongly advised to review thoroughly the subject matter of this course. Each should strive to acquire:

Facility in writing major, minor and chromatic scales, in all keys, with and without signatures, using both G and F clefs; ability to recognize and name intervals and triads and their inversions; the habit of thinking scale tones and triads by number names (beginning the minor with 1 the same as the major).

Daily except Saturday, 9:15, Mr. SCALES.

**Harmony—B.** Open to students who have completed Harmony A or passed it upon entrance.



Triads and their inversions in major and minor tonalities. Connection of the triads in four-part writing. Theory of consonances and dissonances. The dominant seventh and its inversions.

University credit, two hours.

Daily except Saturday, 10:15, Mr. BALLARD; 11:15 and 12:15, Miss WISENELL.

**Melody and Harmony—C.** The principles of melody construction. Normal rhythms and voice progressions. Melody-writing, stepwise and with simple skips. The phrase, the period. Secondary chords of the seventh and their inversions.

University credit, two hours.

Daily except Saturday, 9:15 and 12:15, Mr. JOHNSTONE, Mr. BALLARD.

**Melody and Harmony—D.** Melody writing in major and minor with special reference to harmonic suggestion. Harmonization of melodies. Melody-writing in two parts. Figured basses. Transposition, modulation.

University credit, one hour.

Daily except Saturday, 11:15, Mr. JOHNSTONE.

**Chorus—A** Open to first year students and to others who do not qualify for the advanced Chorus. Practice in sight singing with syllable names, sequential studies, learning to follow the baton, attack, light and shade, posture, etc. Study of music suitable for use in grammar grades and high school

Daily except Wednesday and Saturday, 8:00, Mr. COGSWELL.

**Advanced Chorus—**Open to all C and D students, and to B students who can qualify. Five periods a week are devoted to chorus singing and to instruction in the technical and interpretative elements of choral music. The work forms an important part of the training in Choral Conducting.

Topics for special consideration are: position, breathing, tone production, vowel study, interpretation, and the preparation and performance of choral music. Cantatas and choruses suitable for high and normal schools will be sung by the chorus at the concerts given by the Department of Music.

Daily except Saturday, 8:00 Professor DANN.

**Choral Conducting—D.** Open to fourth year students only. The routine and technique of choral conducting. Each member of the class is required to prepare and conduct choral selections under the supervision of the instructor.

Monday, Tuesday and Wednesday, 9:15 and 10:15, Professor HOERRNER.

**Orchestral Conducting—D.** Open to fourth year students only. A school orchestra from the Ithaca schools will be in attendance. Before entering the course the student shall have taken the courses in School Orchestra or passed an equivalent examination. Members of this class are required to attend at least three rehearsals of the Community Orchestra.

Friday, 12:15, Mr. MATTERN.

Other hours for conducting to be arranged.

**School Orchestra—C or D.** (May be taken either as a C or D subject). An orchestra of pupils from the Ithaca grade schools and one from the Ithaca High School will be in attendance. A large repertoire of music suitable for school orchestras has been collected for the benefit of the members of the class, who will

have the opportunity of observing and participating in the work of organizing, conducting, and developing the school orchestra. Any student who plays an instrument of the symphony orchestra is requested to bring his instrument.

Daily, except Wednesday and Saturday, 3:00, Mr. MATTERN.

**Violin Classes.** Open to all students taking the course for supervisors, without extra charge. Teachers are learning that actual work with the violin is an excellent way to acquire efficiency in dealing with many of the problems of the school orchestra.

Hours to be arranged, Mr. MATTERN.

**Community Orchestra.** Open to music students and to students in all other departments of the Summer Session who can play any instrument of the symphony orchestra. Each student should bring his instrument.

Wednesday, 7:30 p. m., Mr. MATTERN.

**Song Interpretation—B or C** May be taken either the second or the third year. The aim of this course is the preparation for teaching songs to classes of children.

Topics—Tone quality, rhythm, articulation, enunciation, phrasing, and other features relating to song interpretation.

Study and presentation of rote songs by members of the class.

Daily, except Wednesday and Saturday, 2:15, Miss LOW.

**Voice Training—D.** Open to D and E students only. Class lecture lessons. Individual and class instruction and demonstration. The foundation of singing, breath control; free vocal emission and aural appreciation; phrasing, accent, rhythm, and enunciation in artistic rendition; all leading to a strong vocalized declamation without unnecessary effort or complication.

Daily, except Wednesday and Saturday, at 2:15, Mrs. HUNT.

**Principles and Practice of Teaching—D.** This is a home-study course. *The Teacher and the School*, by Colgrove, published by Charles Scribner's Sons, Chicago, New York and Boston. A careful study of this book is essential. A thorough understanding and appreciation of its content will be found to be of very great practical benefit. The student's familiarity with the book will be taken for granted in the D Methods class where it will be used as the basis of methodology.

Fourth year students will write a summary of this book comprising not less than one thousand and not more than fifteen hundred words. The paper must be presented at the office of the Department of Music in the student's own handwriting on Monday, July 9.

**History of Music and Current Events—C.** This is a home-study course. An elementary examination in the history of music and current events for all C students will be given at 2:15 p. m. on Monday, July 9. (See History of Music D.)

**History of Music and Current Events—D.** A general knowledge of the history of music and a fair degree of familiarity with current events, especially in the world of music, is required. An examination will be given to the fourth year class covering only important and well known facts concerning the development of classical, romantic, and modern music; the great composers and their



principal works; contemporary composers and their best known compositions; current events. Whatever special preparation is necessary must be made by means of home study. Hamilton's Outlines of Music History is suggested as a text book in the History of Music and Musical America as a text for the study of current musical events. At least one question will have to do with general current events outside the subject of music. The examination at the 1917 Session will be held at 2:15 p. m., Monday, July 9.

**Musical Appreciation—E.** (Elective.) Open to advanced students. Musical art works analyzed with a view to forming a basis for intelligent criticism. The modern player-piano as an aid to musical appreciation; as an art instrument; its recent applications to pedagogy; its special technique.

Tuesdays and Thursdays 10:15, Mr. JOHNSTONE.

**Musical Composition—E.** (Elective.) Open only to those who have completed Melody and Harmony D. This course includes instruction in the development of musical ideas (motives, themes); the logical sequence of keys; balance of parts of a composition (elementary form); essentials of good melody; song writing; the unity of text and music in rhythm and in content; song accompaniments.

University credit, one hour.

Monday, Wednesday and Friday, 10:15, Mr. JOHNSTONE.

**Orchestra Technique—E.** (Elective) Open to advanced students.

The Orchestra. Its instruments considered separately and in combination; the 23 part symphony orchestra, its sections and parts; smaller combinations—16, 14, 12, and 10 parts and piano; theory and mechanism of the instruments, the transposing instruments; the nature and idiomatic quality of the different parts; position on the violin; the difficulties encountered in connection with different instruments; tuning and seating the orchestra; suitable music, methods of ordering, etc.

University credit, one hour.

Tuesday and Thursday, 11:15, Mr. COGSWELL.

### **PROGRESSIVE SERIES OF PIANO LESSONS (Elective)**

#### **I. Elementary Grade.**

Daily except Saturday, hours to be arranged, Mr. KROEGER.

University credit, two hours.

#### **II Intermediate Grade.**

Daily except Saturday, hours to be arranged, Mr. KROEGER.

University credit, two hours.

Completion of Course I a prerequisite for entrance in Course II

Students who complete Course I and II will receive a Certificate of Qualification to conduct both the Theoretical and Practical Examinations outlined in the standard "Requirements for High School Credits on the Progressive Series of Piano Lessons."

Before receiving this certificate the student will be required to pass the above examinations.

### NORMAL COURSE IN PIANO TEACHING

This course covers the Elementary and Intermediate Grades of the Progressive Series of Piano Lessons and on completion the student will receive a certificate of qualification to teach these grades.

University credit, two hours.

Daily except Wednesday and Saturday, 3 p. m., Mr. KROEGER.

Only those students will be eligible to this Normal Course who possess a certificate of qualification to conduct the examinations outlined in the standard "Requirements for High School Credits on the Progressive Series of Piano Lessons."

Any registered music student who desires to become familiar with the System may attend the classes of the Normal Course, but certificates will be issued only as above provided.

### Physical Education for Women (Elective).

Several courses are offered in this field. A detailed description of them will be found in the announcement of the Department on pages 13 and 14.

### MATHEMATICS

In addition to the courses noted below, each teacher will have a daily office hour for consultation with students. It is urged that this opportunity be utilized by all concerned.

In the following list, courses 1 to 6<sub>2</sub> are the equivalent of those having the same number in the Announcement of the College of Arts and Sciences for 1916-1917.

Courses 1, 2, 3 are planned for those teachers in the secondary schools who wish to review these subjects. They are equivalent to the advanced entrance requirements of Cornell University and of the College Entrance Examination Board. They presuppose a ready knowledge of elementary algebra (through quadratic equations) and of plane geometry. University credit, for 1, 2, 3, three hours each.

1. **Solid Geometry.** Daily, 10. White 27. Assistant Professor SHARPE. (Office hour, 9, White 29). Daily, 9. White 5. Assistant Professor CRAIG. (Office hour, 11, White 4.)

2. **Advanced Algebra.** Daily, 10. White 2. Assistant Professor OWENS. (Office hour 11, White 4). Daily 9. White 5. Dr. SILVERMAN. (Office hour 11, White 8).

3. **Trigonometry.** Daily, 11. White 27. (Assistant Professor SHARPE. (Office hour 9, White 29). Daily 10, White 6. Dr. SILVERMAN. (Office hour 11, White 8).

Students taking 6<sub>1</sub> or 6<sub>2</sub> are requested to take no other University work during the summer, without special permission.

University credit for 6<sub>1</sub>, 6<sub>2</sub> six hours each.

6<sub>1</sub>. **Analytic Geometry and the Calculus.** Daily, 8 and 11. White 1. Assistant Professor GILLESPIE. (Office hour, 9, White 3).



**62. Analytic Geometry and the Calculus.** Daily, 8 and 11, in three sections:  
 White 21. Assistant Professor CARVER. (Office hour, 9, White 22).  
 White 6. Assistant Professor HURWITZ. (Office hour, 10, White 8).  
 White 25. Dr. McKELVEY. (Office hour, 10, White 26.)

**G. Projective Geometry.** Daily, 9. White 2. Credit three hours. Assistant Professor OWENS. (Office hour, 11, White 3).

In this course the principles underlying projective forms and constructions of the first and second degrees will be carefully developed. Particular attention will be paid to the application of these principles to elementary geometry, so as to make the work helpful to teachers of this subject. No knowledge of mathematics beyond plane geometry will be presupposed.

**H. Advanced Calculus.** Daily 10. White 1. Credit three hours. Assistant Professor CRAIG. (Office hour 11, White 4).

The subject-matter of the course will be chosen from elementary differential equations and the fundamental theorems of the calculus. Since the more definite choice of topics will depend on the needs and wishes of the members of the class, correspondence with prospective applicants is desirable.

### MATHEMATICS FOR TEACHERS

**K. Foundation of Elementary Mathematics.** Daily except Sat., 9, White 24. Credit two hours. Professor SNYDER. (Office hour, 10, White 26).

The fundamental operations of algebra and geometry will be developed logically and historically; the topics to be discussed include rational and irrational numbers, complex numbers, factor theorem, infinity, equivalent systems of equations, axioms and postulates of geometry, graphs.

**L. Correlation in Mathematics.** Daily except Sat., 11. White 24. Credit two hours. Professor SNYDER. (Office hour, 10, White 26).

Problems in geometric construction will be solved, algebraically, then the results interpreted geometrically; the capabilities and limitations of constructions by means of ruler and compass will be exhaustively treated, including the inscription of the regular polygon of seventeen sides.

In addition to the preceding courses, the teachers of mathematics will be ready and willing to assist advanced students in various lines of mathematics by conferences, direction of reading, and by proposing definite problems for research. Correspondence is invited.

### PHYSICS

All work in Physics is given in Rockefeller Hall. Regular University students may take work under the same conditions as prescribed for the regular University terms and credit will be allowed as indicated below.

All courses are open to teachers who can take them with profit. Those who have not had college physics are advised to take courses 2 or 3 and 10. Those who have had college physics may take courses 8 or 9 and 12 and the lectures in course 2 may be attended even if not taken for credit. Teachers are entirely at liberty to take portions of courses when such an arrangement is to their advantage. Every effort will be made to adapt the work to the needs of students and to give opportunity to profit from the exceptional equipment of the laboratory.

2. **Lectures with Experiments and Recitations.** Credit five hours. Daily 8-10, Rockefeller A. This course is intended to furnish a basis for all following courses as well as to give a fairly complete survey of general physics for those not intending to take up work depending directly on physics. The equipment for lecture demonstration is unusually complete and has been given careful attention by many members of the staff. Teachers and others familiar with the elements of the subject may find the course useful and suggestive.

The lectures will be given daily at 8 and will be followed by an informal discussion or recitation at 9. Kimball's College Physics will be used for reference. Professors SHEARER and GIBBS.

3. **Lectures, Recitations and Problems.** Credit six hours. The work in this course includes in addition to the lectures and recitations as outlined and scheduled under Physics 2 two hours per week spent on problem work bearing directly upon the general subject matter of the course. This course will be given if six or more applications for it are received before the third day of instruction.

Problem work at hours to be arranged. Assistant Professor GIBBS.

5. **Informal Conference Work for Teachers.** Assistant Professor GIBBS. No University credit.

For the benefit of teachers who desire help in connection with the subject matter or other phases of their Physics teaching; consultation hours will be held by appointment.

If before the third day of instruction six or more teachers express a desire for an informal discussion or colloquium upon topics to be selected by the class from the subject matter of Physics arrangement will be made to hold these discussions daily except Saturday at 12. It may be expected that these discussions will be such as would be engaged in with profit by those who have had an introductory course in College Physics.

Those who are registered in either Physics 10 or 12 and who take this work at 12 may arrange to start their laboratory work at 9 instead of 10.

8. **General Physics.** Recitations. Theory and problems covering mechanics, magnetism and electrostatics. Credit two hours. Prerequisites; Physics 3 or the equivalent and a working knowledge of analytic geometry and the calculus. Daily exc., Sat, 8. Rockefeller 105. Mr. BIDWELL.

9. **General Physics.** Recitations. Theory and problems covering the electric current capacity and electromagnetics; also a critical study of the various thermometer scales, methods of temperature measurements, etc. A continuation of Physics 8. Prerequisite: Physics 8. Daily exc. Sat., 9. Rockefeller 106. Credit, two hours. Mr. BROWN.

Physics 8 and 9 constitute a second course in College Physics. They follow more or less closely the subject matter given in the corresponding courses during the regular academic year, which courses are required of students in Sibley College. It is recommended that the corresponding parts of Physics 14 should be taken simultaneously with Physics 8 or 9.

10. **Physical Laboratory.** This course may with profit be taken by teachers of elementary physics who wish to acquire a teaching familiarity with introductory laboratory work; and by those students who have had or are taking Physics 2



or the equivalent. The experiments offered include studies in units, statics, kinetics, properties of matter, light, sound, electricity and magnetism. A part of the work is quantitative, designed to acquaint the student with a few of the methods of measurement; a part is qualitative, presenting such elementary physical phenomena as spectra of various substances, color of various illuminants, color mixture; a part consists in studying some of the fundamental physical laws and constants partly from the quantitative, partly from the qualitative standpoint.

The work may be varied and the material covered adjusted to suit the needs of the student, since the instruction is in all cases individual.

Credit one to three hours. Prerequisite Physics 2 or the equivalent. (Open to students taking Physics 2 simultaneously). One to five three hour periods per week as arranged. Assistant Professor RICHTMYER and Mr. BIDWELL.

**12. Physical Experiments.** Primarily for teachers and students who wish a thorough introduction to the theory and methods of physical measurement and observations either as a preparation for graduate study or as an extension of previous work in Physics. The methods of setting up and adjusting apparatus, the study of sources of error and their elimination, methods of computation and arranging data, the interpretation of results, both analytically and graphically, are given special emphasis.

The large amount of apparatus available makes possible accurate measurements in the various branches of physics. The experiments offered comprise such subjects as force, work, power, efficiency of machines, linear and angular motions, moment of inertia, elasticity, vapor tension, a study of the analytical balance: velocity of sound in air and in metals, wave motion, vibration of strings and wires under tension; study of lenses and mirrors with special attention to the use of the spectrometer and the diffraction grating in measuring wave lengths of light and indices of refraction; photometry; in electricity and magnetism a special series of experiments is offered intended to give a thorough grounding in electrical measurements and at the same time to bring out the relations of the several electrical units to the fundamental units of mass, length, and time. By special arrangements, a limited number of experiments involving a study of dynamos and motors is also offered.

The instruction is individual and the topics covered may be adjusted to meet the needs of the student. Credit one to four hours. Prerequisites: the equivalent of eight hours of college physics (unless either Physics 8 or 9 be taken in parallel) and a knowledge of the elements of analytic geometry and the calculus. One to five three hours periods per week. Daily, except Sat., 10-1 (or 9-12 by special arrangement). Rockefeller 252. Assistant Professor RICHTMYER and Mr. BROWN.

**14. Physical Experiments.** Students of whom Physics 14 is required in the regular academic year may substitute therefor Physics 12, as given in the summer session.

The following courses are suggested for students desiring to elect theoretical Physics in Summer Sessions. They are subdivided in such manner that the two parts of any topic are substantially equivalent to the corresponding course as given during the college year. It is expected to complete this sequence of courses once

in four summer sessions. A student may elect either part of any of the topics without the other. In general those taking any of these courses should have completed the equivalent of Physics 2, 4, and 10 of the college year.

These courses may be taken for credit toward a master's degree in Physics, subject to the requirements of the graduate school.

[20a. **Heat.** Expansion, thermometry, calorimetry, conduction and change of state.] Not given in 1917.

[20b. **Heat.** Kinetic theory, radiation, absorption, and thermodynamics.] Not given in 1917.

[21a. **Light.** Reflection, refraction, chromatic and spherical aberration and optical instruments.] Not given in 1917.

[21b. **Light.** Wave theory, dispersion, interference, diffraction and polarization.] Not given in 1917.

[22a. **Electricity and Magnetism.** Magnetism, static electricity, capacity, laws of Ohm and Kirchhoff, and direct current phenomena.] Not given in 1917.

[22b. **Electricity and Magnetism.** Thermo electricity, alternating current phenomena including self and mutual induction and high frequency, and electrons.] Not given in 1917.

23a. **Properties of Matter.** Inertia and gravitation including a short study of the dynamics of solids. Daily except Sat., 8. Rockefeller C. Mr. MURDOCK.

[23b. **Properties of Matter.** Elasticity, dynamics of fluids, surface tension and viscosity.] Not given in 1917.

The courses that may be expected in the Summer Sessions of the years 1917-1921 are shown below:

1917 23a.

1918 23b and 21a.

1919 22a and 21b.

1920 22b and 20a.

1921 23a and 20b.

25. **Advanced Laboratory Practice.** Special laboratory work in Physics open to those students who have had Physics 12 or its equivalent and who desire to take up special subjects for detailed study putting more time on individual problems than is advisable in Physics 12. It is intended for those who desire to prepare for research work in Physics and for teachers in laboratory Physics in colleges. Credit varies with the amount of work done. The laboratory will be open daily except Sat., 9-12. Rockefeller 301. Mr. MURDOCK and other members of the staff.

44. **X-Ray Laboratory.** A special course in X-Ray photography and fluoroscopy will be offered for those qualified for the work. This will include operation of induction coils, transformers, various tubes, measurement of radiation and developing plates. The course is intended for those expecting to operate such apparatus in private or hospital practice as well as for students interested mainly in the physics of Roentgen ray. Plates and paper must be furnished by the students. July 30 to August 17, daily except Sat., 10 to 12. Professor SHEARER.



## CHEMISTRY

The courses announced below correspond entirely or in part with regular University courses. In numbering these summer courses, 200 has in each case been added to the number of the corresponding course given during the regular sessions of the University.

The recitation and laboratory work will be arranged, within reasonable limits, to meet the individual requirements of teachers registered in the respective courses. For students wishing to obtain University credit, the requirements for admission to the courses will be the same as during the regular University sessions. For teachers not intending to have their work apply toward a Cornell degree, these requirements will not be rigidly enforced.

**201. Introductory Inorganic Chemistry.** a. Lectures daily except Sat., 12, Rockefeller B. Professor BROWNE and Mr. MCCOY. The lectures deal with the fundamental theories and laws of chemistry and with the more common elements and their compounds. They are profusely illustrated by experiments. The course is primarily designed to meet the needs of teachers in secondary schools, and to that end emphasis is laid upon methods of lecture presentation and experimental demonstration. Students other than teachers must, before registering, satisfy the department that they are properly prepared to carry on the work.

b. Laboratory work, M W, 8-12, and T Th F, 9-12. Morse Hall. Dr. WELSH and Mr. MCKINNEY. A series of experiments designed to illustrate the fundamental laws of chemistry and to acquaint the student with the properties of the principal elements and their compounds. For the benefit of teachers who may take the course especial attention will be given to methods of laboratory instruction, qualitative experiments, and the blowing of simple glass apparatus.

c. Recitations. T Th F, 8. Morse D. Dr. WELSH. The recitations deal with the subject matter of the lectures and with the experimental work in the laboratory; thorough drill in the solution of chemical problems.

Credit for a, b and c, six hours.

**206. Elementary Qualitative and Quantitative Analysis.** This course is divided into two parts, either of which may be taken without the other. Credit, two, three, or five hours.

A. Qualitative Analysis. Lectures, M W F, 11, Rockefeller C. Dr. RHODES. Laboratory, daily except Sat., 1.30-4.30. Dr. RHODES and Mr. GILCHRIST. An elementary course for those who have had the equivalent of course A. A study in laboratory and class room of the methods for detecting and separating the principal bases and inorganic acids. This is followed by the analysis of various substances, either in solution or in solid form, the composition of which is unknown to the students. Considerable emphasis is laid upon the writing of equations expressing the reactions involved in the work.

B. Quantitative Analysis. Elementary. Lectures, T Th, 11, Morse 18. Laboratory, M W F, 8-11. Credit, two hours. Assistant Professor LUNDELL and Mr. KOLLER.

An introduction to quantitative methods and the chemistry upon which these methods are based. Lectures, explanatory of the methods used, are first given; each student then performs simple analyses which involve the use of the apparatus ordinarily employed in analytical work.

Advanced work (see course 214) may be taken by students who complete this course before the close of the session.

**207. Qualitative Analysis.** Lectures and recitations, M W F, 11, Rockefeller C; T Th, 8, Rockefeller 109. Dr. RHODES. Laboratory work, daily except Sat., 1.30-4.30, and M W F, 8-11. Dr. RHODES and Mr. GILCHRIST. Credit, one to six hours.

This course comprises (1) A study in class room and laboratory of the methods for detecting each of the important acids in the presence of the others, together with the reactions involved, followed by the analysis of more complex mixtures than those assigned in course 206A; and (2) A comparative study in the laboratory of different methods of detecting and separating the bases.

**212. Quantitative Analysis.** Lectures, daily except Sat., 8. Morse C. Assistant Professor LUNDELL. Laboratory, daily except Sat., 9-1. Assistant Professor LUNDELL and Mr. KOLLER. Credit, four, five, or six hours.

A longer elementary course in which extended practice in volumetric and gravimetric analysis is offered.

**214. Quantitative Analysis, Advanced Course.** Laboratory practice at hours to be arranged. Credit, one, two, three, or four hours. Assistant Professor LUNDELL and Mr. KOLLER.

This course comprises instruction in certain gravimetric, volumetric, and electrolytic methods of analysis, and in the methods of combustion analysis. The work includes the analysis of iron ores, iron and steel, slags, coal and coke, cements and cement materials, alloys, ores of copper, lead, zinc, mercury, manganese, tin, etc.

**216. Electrochemical Analysis.** Laboratory practice at hours to be arranged. Assistant Professor LUNDELL and Mr. KOLLER.

A study of the most approved electrochemical methods for the determination of silver, lead, copper, tin, nickel, cobalt, and zinc. Practice will be given in the analysis of alloys and ores.

**219. Qualitative and Quantitative Gas Analysis.** Lectures, daily except S., 12. Morse 18. Credit, two hours. Assistant Professor ANDERSON.

A detailed discussion of many representative types of apparatus employed by the gas analyst, and of the various methods of analysis involved in their use. Numerous simple problems are assigned which afford practice in the calculation and interpretation of the results obtained in gas-analytical work.

**220. Technical Gas Analysis.** Laboratory practice, at hours to be arranged. Credit, two hours. Assistant Professor ANDERSON and Mr. ERSKINE.

The analysis of gas mixtures with the apparatus of Honigmann, Bunte, Orsat, Winkler, and Hempel; the complete analysis of flue gas, coal gas, Pintsch gas, Blau gas, natural gas, producer gas, acetylene, and air; the determination of the heating power of gaseous, liquids, and solid fuels, and the analysis of various substances by gas analytical methods involving the use of the different types of gas evolution apparatus such as the Scheibler calcimeter, the Hempel, and the Lunge nitrometer, the Lunge gasvolumeter, and the Bodländer gasbaroscope. Within certain limits the work may be selected to suit the requirements of the individual student.



Courses 219 and 200 should be taken at the same time.

[224. **Opticochemical Methods.** Lectures, daily except S., 12. Laboratory practice at hours to be arranged. Credit, three hours. Assistant Professor ANDERSON.

The lectures deal with the construction and with the use in chemical analysis of the spectroscope, polariscope, refractometer, colorimeter, spectro-photometer and nephelometer. The laboratory instruction includes the following work: the observation and mapping of emission spectra of various elements in the Bunsen flame, the oxy-hydrogen flame, the electric arc, and the electric spark; the qualitative analysis of mixtures and minerals with the aid of the Krüss spectroscope and the direct vision spectroscope; the observation and mapping of absorption spectra; the examination and identification of rare earths and of organic dyes in solution, by means of their absorption spectra; the calibration of spectroscopes; spectrum photography with the Hilger wave-length spectrometer and with the Steinheil grating spectrograph; and practice in the use of colorimeters, polariscopes, and refractometers of various types.] Not given in 1917, but will probably be given in 1918.

**230. Organic Chemistry.**

A. Aliphatic compounds. Lectures and recitations. Daily except Sat., 8. Morse 18. Laboratory practice at hours to be arranged. Credit, four to six hours. Professor ORNDORFF, Dr. MAHOOD, and Mr. JACKSON.

B. Aromatic compounds. Lectures and recitations. Daily except Sat., 10, Morse 18. Laboratory practice at hours to be arranged. Credit, four to six hours. Dr. MAHOOD and Mr. JACKSON.

This course presupposes a knowledge of elementary chemistry, and Part B must be preceded or accompanied by Part A. The two parts of the course may be taken together, or Part A may be taken one summer and Part B the following summer.

**231. Organic Chemistry.**

A. Aliphatic compounds. Lectures and recitations. Daily except Sat., 8. Morse 18. Credit, three hours. Professor ORNDORFF and Mr. JACKSON.

B. Aromatic compounds. Lectures and recitations. Daily except Sat., 10, Morse, 18. Credit, three hours. Dr. MAHOOD and Mr. JACKSON.

These lectures and recitations are the same as those of Course 230. Course 230 should be taken in preference to course 231 whenever it is possible.

**232. Organic Chemistry, Shorter Course.** Aliphatic and aromatic compounds. Lectures and recitations. Daily except Sat., 8, Morse, L. R. 3. 10, Morse 18, during the first three weeks of the session, and 8 only during the remainder of the session. Laboratory practice at hours to be arranged. Credit, four hours. Professor ORNDORFF, Dr. MAHOOD, and Mr. JACKSON.

The lectures and recitations of this course include all of those of Course 230A, and the first half of those of Course 230B. Course 232 presupposes a knowledge of elementary chemistry, and is designed more particularly for students registered in the Colleges of Medicine and Agriculture, although it may be elected by any suitably prepared student desiring a course in Organic Chemistry shorter than 230 or 231.

**234. Advanced Organic Chemistry.** Laboratory practice at hours to be arranged. Credit, two or more hours. Professor ORNDORFF, Dr. MAHOOD, and Mr. JACKSON.

The course in the preparation of organic compounds is here continued, the preparations, however, being more difficult, and requiring more skill and experience on the part of the student.

**237. Methods of Organic Analysis.** Laboratory practice with occasional lectures. Hours to be arranged. Credit, two or more hours. Professor ORNDORFF and Dr. MAHOOD.

This course comprises the qualitative and quantitative analysis of pure organic compounds, and of such commercial products as alcohols, ethers, organic acids, glycerol, formalin, acetates, soaps, turpentine, rosin oils, etc.

**248. Selected Topics in Advanced Inorganic Chemistry.** Lectures, M W F, 10, Morse D. Credit, one hour. Dr. WELSH. Experimental lectures dealing with various topics in the field of general and inorganic chemistry, and covering some of the more important recent advances.

**269. Elementary Sanitary Chemistry.** Lectures, recitations, and laboratory practice. Credit, five hours. Lectures daily except Sat., 8. Morse D. Twenty hours of laboratory practice at hours to be arranged. Two recitation periods are included in this time. Mr. GEORGIA.

The course is planned to serve as an introduction to the methods and objects of chemical science as applied to the problems of public health. The work during the Summer Session of 1917 will comprise: the analysis of foods and food accessories.

Course 269 is the equivalent of the second term of course 69 given during the regular University session, and presupposes a knowledge of qualitative and quantitative analysis, and of organic chemistry.

**296. Research.** Credit, one to six hours. Senior chemists, and others by special permission, may elect research under the direction of some member of the staff of instruction.

## GEOGRAPHY AND GEOLOGY

**Illustrated Special Announcement.** A special announcement with many photographic illustrations showing typical features of the Cornell environment and the work of excursion classes in the field is published for the department and may be had post-free on application to the Director of the Summer Session. The text of this special announcement is devoted largely to an explanation of the advantages of the Cornell region or outdoor study of both geography and geology. As the special announcement was issued in 1914 it should be noted that there are changes in the courses as listed in the following paragraphs for 1917.

**Equipment and Purpose.** The lecture rooms and laboratories are in McGraw Hall. It is the purpose in this department to meet, primarily, the needs of teachers in grammar schools, high schools, normal schools, and colleges. A second aim is to provide courses of practical and cultural value to college students. The work embraces lectures, laboratory, and field instruction in physical and industrial geography, and in the elements of geology.



The environs of Cornell University are rich in phenomena of geographic and geologic interest. Consequently field excursions are made an especially important part of the work of this department in the Summer Session.

The laboratories are well equipped with apparatus and illustrative material for instruction. This material includes teaching and reference collections of minerals, rocks, fossils, maps, photographs, models, and more than five thousand lantern slides.

For entrance credit ( $\frac{1}{2}$ ) unit in physical geography, a student is required to attend, complete all required work, and pass the examinations in courses A, H, and J.

### LECTURE COURSES IN GEOGRAPHY AND GEOLOGY

**A. Physical Geography.** An introductory course in physical geography covering most of the subjects treated in the modern texts, but touching more fully on the general concepts and the theoretical side of the subject than is possible in high school work. Some of the topics treated are the general form of the earth, origin, and distribution of relief features, processes and progress of the physiographic cycle and the resultant development of land forms, configuration of the ocean basins, nature and effects of the continental glaciation, and the bearing of these various phenomena on life relationships. Students interested are advised that special courses in meteorology are offered in the College of Agriculture, Summer Session. See announcement of that college.

The lectures in physical geography are fully illustrated by lantern slides, wall and globe maps. Readings will be assigned in Tarr and Martin's "College Physiography." Students registering in this course are advised to take also the related courses H and J, and if possible E. M T W Th, 9. Geological Lecture Room. Assistant Professor VON ENGELN. Credit, two hours.

**B. Commercial and Industrial Geography.** M T W Th, 11. Geological Lecture Room. Assistant Professor VON ENGELN. Credit, two hours.

The course will consist of lectures, text readings, and special topics for individual study and report. Consideration will be given to climatic factors in their relation to commerce and industry, to the occurrence and uses of agricultural, forest, mineral, and fish resources, to the distribution and magnitude of leading industries in their relation to geographic conditions, and to the relative importance of commercial routes as determined by their nature, facilities, and the character of products exchanged by their use. The course should be helpful to teachers of regional geography in the grade schools as well as to the commercial and industrial geography teacher in the high school.

**E. Geology. A General Introductory Course.** M T W Th, 10. Geological Lecture Room. Assistant Professor MONNETT. Credit, two hours.

Among the topics discussed are: origin of the earth; geological evolution of continents and ocean basins the significance, areal distribution, and structural features of the great rock groups, as well as the forces modifying them; vulcanism, earthquakes, and similar phenomena.

Especial attention will be given to the geological evolution of life forms and the methods of determining geological facts. The lectures will be illustrated with

lantern slides, models, maps and specimens. Students registering for this course are urged to take the laboratory course I, and, if possible, course J.

## LABORATORY AND EXCURSION COURSES IN BOTH GEOGRAPHY AND GEOLOGY

**H. Physical Geography, Laboratory Course.** The members of this class will make a systematic study of the physiographic Regions of the United States using contour maps, models and the experimental laboratory of the department in a laboratory study of the subject. By such study the topographic regional and life relationships (human, animal, and plant) of the geography of the United States will be correlated and presented as an orderly whole. The course will prove of worth to grade teachers of geography who wish to obtain a broader basis for their work in the subject as well as for those who expect to teach geography in the high schools.

A laboratory fee of \$1.00 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance. T Th, 2-4. Physical Geography Laboratories. Mr. ELSTON. Credit, one hour.

**I. Geology, Laboratory Course.** W F, 2-4. General Geology, Laboratory. Assistant Professor MONNETT. Credit, one hour.

This course is designed to supplement course E. A study will be made of the more common structural phenomena; of the interpretation and uses of geological maps; of characteristic life forms developed in different geologic periods; and of the more common rocks and minerals. Short field excursions will be made to collect both rock specimens and fossils.

A laboratory fee of \$1.00 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

**J. Geography and Geology, Field Course.** This course should be elected by all those registering in course A or E and is required of all those who desire entrance credit in physical geography. With courses A and H it affords a comprehensive course in physical geography; with courses E and I it will give a similarly broad training in elementary geology, as the dynamic phases of geology are emphasized on the excursions. Mimeographed outlines of the excursions are to be secured by each student desiring credit.

Students not registered in the course or department are invited to attend these excursions but must conform to the directions of those in charge. Those desiring University or entrance credit must take field notes and hand in written reports. Excursions 1-6 are required of all students in the course, and in addition they must make either two of 7, 8 and 9; or one of 10 and 11 for one hour's credit.

Meeting place and time announced in mimeographed outlines or by Bulletin. Meet for first excursion, Monday, July 9th, at Geological Lecture Room, McGraw Hall, 2.30 p. m. Excursions 1-6, Monday afternoons; 7, 8, 9, 11, all day Saturday; 10 Friday and Saturday. On the excursions to which a cost is attached persons wishing to go must register at the department and secure tickets in advance of the date of the trip.

The longer excursions will be under the general charge of Assistant Professor von Englen with the co-operation and assistance of the other members of the instructing staff. On the excursions stops will be made at points of interest, explanations made, questions asked and discussion invited.



## OUTLINE OF EXCURSIONS—Course J

## Monday Afternoons

1. **Campus and Vicinity.** To study the action of streams and the progress and form of valley development. Visiting Alumni Field, upper Cascadilla Gorge, and Goldwin Smith Walk. July 9.

2. **Eagle Hill.** To become acquainted with the lay of the land about Cornell, to learn the place names of the broader physiographic features, studying en route, processes of weathering, and, at the summit, the maturely dissected plateau. The top of the hill is a vantage point from which a good view of the lake and the land for miles to the north, east and west may be had. July 16.

3. **Fall Creek and Deadhead Hill.** To study the origin and nature of sedimentary rocks, also processes of erosion, transportation, deposition and cementation. An intimate view of one of the large gorges and its especial features, particularly Ithaca Falls. July 23.

4. **Shore of Cayuga Lake.** To study shore line phenomena, joint planes, bedding, and stalactite formation. A walk for several miles along the east shore of the Lake. Probably return by trolley, if so, expense \$.15 to \$.20 may be paid at the time. July 30.

5. **Terminal Moraine. North Spencer.** By train. Expense about \$.75. Probably leave lower Lehigh Station at 1.35 p. m. return 5.38 p. m. To study a massive morainic loop, the basin in which the former ice tongue rested and the outwash deposits and overflow channels to the south. Truncated valley sides due to glacial erosion. The most striking examples of glacial phenomena in the Cornell Region. August 6.

6. **Six Mile Creek.** To study the effect of glaciation on a stream course. Relations to water supply and power development. A climb into and walk through one of the gorges in Six Mile Creek and an interpretation of its complicated physiographic history. August 13.

## All-Day Excursions

7. **Taughannock Gorge and Falls.** By boat. Expense about \$.75. To study the Inlet Plain, its reclamation, the Barge Canal terminal, the position and succession of the Devonian strata along the lake shore and the deep gorge and falls of Taughannock. A sail along the west shore of the lake and a walk through the great gorge to Taughannock Falls one of the highest straight falls east of the Rockies. Luncheon at the foot of the falls. July 14.

8. **Enfield Gorge and Falls.** By wagon. Expense about \$1.10. To study the relations of preglacial and hanging valleys and the postglacial and interglacial gorges, their origin and features. Joint plane guidance of stream courses. A ride to the head of the gorge, climb through it to the crest of Lucifer Falls. Enfield is perhaps the most picturesque and wildest of the gorges in the Cornell Region. July 21.

9. **East Shore of Cayuga Lake.** Expense about \$1.10. To study the Devonian and Silurian rock exposures along the shores of Lake Cayuga; collection

and interpretation of fossils from the various horizons and a study of the stratigraphy in its relation to economic geology and geography notably at the cement and salt plants. In charge of Professor MONNETT. August 11.

### Longer Excursions

10. **Niagara Falls and Gorge.** By special train and trolley cars. Expense between \$8.00 and \$10.00. Overnight at Niagara Falls. July 28.

All the important scenic features of Niagara Falls and Gorge are visited and their physiographic history interpreted. As a whole these phenomena constitute a striking record of some of the most interesting chapters in the geologic and physiographic history of North America. Before the trip a special meeting of those interested will be held in the Physical Geography Laboratory when the relations of the different places will be explained and illustrated by large scale relief model of the Niagara Region. Students are advised to send to Director U. S. Geological Survey, Washington, D.C., for a copy of Niagara Folio, No. 190, in octavo form, cost \$.50 in coin or money order.

There may be opportunity for members of the class who are interested primarily in industrial and commercial geography to see something of the power development at Niagara, and for the stratigraphic geologist to collect fossils from the great Niagara Gorge section, but the main portion of the class will devote its attention to the dynamic geology and physiographic interest of the region.

11. **Watkins Glen.** By special train. Expense about \$2.00. August 4.

Watkins Glen is considered one of the most beautiful scenic spots in the country. It has been secured for a state park by New York and all parts of it made accessible. The excursion party will study the gorge, its pot holes and falls in detail; and consider its relations to the Seneca Lake Valley in comparison with the conditions at Ithaca as referred to the Cayuga valley. Train ride across the dissected upland country to the south and west between Ithaca and Watkins.

## SHOP WORK AND DRAWING FOR ENGINEERING STUDENTS

### Drawing

For further information regarding course C, apply to Professor Pond; for information regarding the drawing and shop courses apply to Professor Kimball, 205 Sibley.

A. **Mechanical Drawing.** A course in drawing for beginners, covering use of instruments, orthographic and isometric projection, inking, tracing, conventions, working drawings, M W F, 8-11 and daily except Sat., 2-5. Sibley 203. Assistant Professor HAM.

B. **Machine Sketching and Drawing.** A more advanced course in mechanical drawing for those who have had the equivalent of course A. Sketching of machine parts, machine drawing from sketches, empirical design. This course is an application of the work in course A to such machine designing as can be done without a knowledge of mechanics. M W F, 8-11 and daily except Sat., 2-5. Sibley 203. Professors KIMBALL and HAM.



**C. Descriptive Geometry.** Lectures, daily except Sat., 9. Recitations and drawing daily except Sat., 10-12. Lincoln Hall. Assistant Professor POND.

A study of the representation of lines, planes, surfaces, and solids, and their interrelations. Warped surfaces. Tangencies. Intersections, shades and shadows, and perspective. The work is the same as is given in the regular C.E. course I, and the student will receive five hours credit if he takes the whole course. A three hour course that does not include shades and shadows and perspective, and fulfills the requirements for the Mechanical Engineering students of Sibley College will also be given. The latter will be given from 2-5 p. m. if there are students enough to make up an extra section. The morning and afternoon sessions make it possible to readjust the above schedule so as to accommodate nearly all who wish to take either course.

### Shop Work

**A. Pattern Making.** Use of woodworking tools; elements of pattern making. Mr. HOOPER.

**B. Foundry Work.** Moulding, casting, mixing of metals, operation of cupola, etc. This course will be given only if the registration is large enough to warrant it.

**C. Forge Work.** Forging, welding, tempering, etc.

This course will be given only if the registration is large enough to warrant it.

**D. Machine Work.** Use of measuring tools; hand and machine tools; fitting and assembling.

Daily except Sat., 8-11, 1-5, and Sat., 8-11. Mr. WELLS and Mr. BUCK.

**E. Manual Training.** The scope of the foregoing courses in shop work is the same as that of the corresponding courses given to the regular Sibley College students. They are intended for prospective or actual engineering students. In addition to these, special courses are offered in each shop, designed to meet the wants of manual training teachers, and given in close connection with the technical work of manual training. (See pp. 15-18). Teachers having special needs may have courses laid out to suit their wants. At the same time it is greatly to their advantage to see the work as given to the regular engineering students.

### MECHANICS OF ENGINEERING

**Textbooks:** Church's *Mechanics of Engineering*, and *Notes and Examples in Mechanics*, supplemented by other printed notes and problems.

**Classes** are held in Lincoln Hall, Room 24. Assistant Professor E. W. RETTGER and Mr. W. R. CORNELL. Office Room 22A.

Course A is the equivalent of M.5, and Course B is the equivalent of M. 6 of Sibley College.

Course C. 1 is the equivalent of the first term of course 20, and course C. 2 is the equivalent of the second term of course 20 of the College of Civil Engineering.

Further details about the work may be learned from Professor RETTGER. Lincoln Hall.

**A. Mechanics.** Statics of a material joint and of rigid bodies; center of gravity and moment of inertia of plane figures and of rigid bodies; chains and cords; kinetics for a material point and of rigid bodies; friction; work and energy.

Lectures and recitations, two hours daily, 8-9 and 11-12.

**B. Mechanics.** Moment of inertia of plane areas; stress and strain; strength and elastic properties of materials in tension, compression and shearing; torsion; bending moment, safe loading, deflection and resilience in simple and continuous beams; non-prismatic beams; combined bending and torsion; eccentric loading; curved bars and hooks; columns.

Lectures and recitations, two hours daily, 9-10 and 12-1.

**C. Mechanics C. 1.** By course C. 1 is meant a course comprising those portions of A and B that cover the ground of the first term work of course 20 of the College of Civil Engineering.

**Mechanics C. 2.** By course C. 2 is meant a course comprising those portions of A and B that cover the ground of the second term work of course 20 of the College of Civil Engineering.

### BRIDGE AND STRUCTURAL ENGINEERING

The following courses are the same as those given during the college year. For further information communicate with Professor Burrows.

**C.E. 71. Structural Design and Bridge Stresses.** Credit, two or four hours. Prerequisite Mechanics 20. One-half of the course includes structural details, i. e., the design of a wooden roof truss and of other timber joints. The other half of the course includes dead load, live load, wind load, and impact stresses in simple bridge trusses due to uniform live panel loads, locomotive axle loads, and road roller loads. This course is equivalent to first term C.E. 71. Lectures, recitations, computations, and drawing at hours to be assigned. Lincoln Hall 22 and 29. Assistant Professor BURROWS and Mr. URQUHART.

**C. E. 71. Bridge Design.** Credit, four hours. Prerequisites. Structural Design and Bridge Stresses. Computations and drawing for the complete design of a riveted railroad bridge truss, the stresses for which were computed in connection with the previous work in Bridge Stresses. The computations to determine the sections of all members, of pins, pin plates, splices, and other details as well as of connecting rivets are to be written up in the form of systematically arranged reports. The drawings consist of general detail plans showing the location of all rivets as well as the composition and relations of all members and connections. The final report is to give a full list of shapes and plates and a classified analysis of weights for the span. Lectures, computations, and drawing at hours to be assigned. Lincoln Hall 14 and 22. Assistant Professor BURROWS and Mr. URQUHART.

**C. E. 72. Reinforced Concrete Arch.** Credit, three hours. Prerequisites Mechanics 20, and that portion of course 71 which deals with elementary graphic statics. The design of an arch of reinforced concrete including the abutments and centering. Lectures, computation, and drawing, at hours to be assigned. Lincoln Hall 14. Assistant Professor BURROWS and Mr. URQUHART.

This course may be substituted for Engineering Design, C.E. (9if).



C. E. 77. **Concrete Construction.** Credit, three hours. Prerequisite Mechanics 20.

Elementary theory of reinforced concrete, including properties of materials, rectangular beams and slabs. T-beams, beams reinforced for compression, columns, and footings. The "straight line" theory is generally used, but the flexure formulas for ultimate loads are also discussed. The computing work involves the design of a small reinforced concrete building, and three drawings conforming to the best modern practice, are made of the structure designed. Textbook: Hool's *Reinforced Concrete Construction, Volume 1*. Lectures and recitations twice daily for two weeks, computing thereafter four hours daily except Saturday. Assistant Professor BURROWS and Mr. URQUHART.

## HYDRAULICS

In the scope and method of treatment, the course in theoretical hydraulics as given in the Summer Session is identical with the course (C.E. 23) given in the fall term, except that no laboratory demonstration lectures are given and the field is covered in slightly fewer lessons. It is intended primarily as a course in systematic tutoring for students in the College of Civil Engineering who have failed to pass off the course during the regular term, and except as noted below, full University credit (five hours) cannot be given to any other persons who may attend this course.

There are two recitations daily, except Saturday, at 8 and 12 o'clock, and two computing periods per week from 2 to 4:30 on days to be arranged.

Students in the Department of Chemistry or in Sibley College, desiring this course to obtain credit corresponding to Course M12 (2 hours credit) may, with the sanction of the Committee on Summer School Studies of Sibley College, arrange to take a portion of the work of this class corresponding to the Sibley work. The schedule has been arranged so as to have the required Sibley work come at the 8 to 9 hour session of the class. Registration for the Summer Session class in Hydraulics should be made before the close of the spring term or by letter.

The topics treated in the course are as follows:

Hydrostatics; measurement of pressures; strength of pipes; dams and retaining walls; immersion and flotation; earth pressures; pneumatics of air motors and compressors; barometric levelling; flow of water; orifices; weirs; pipes; fluid friction and loss of head; general application of Bernoulli's Theorem; steady flow in open channels; uses of Kutter's and Church's Diagrams; hydraulics of machinery and motors; water wheels; impulse and reaction turbines; theorem of flow through rotating casing; power, speed and discharge of turbines; theory of testing motors; discharge of centrifugal pumps; flow of gases; etc.

Classes are held in Lincoln 28. Assistant Professor SEERY.

# STATE COLLEGE OF AGRICULTURE

## OFFICERS

Albert Russell Mann, A.M., Acting Dean of the College of Agriculture and Acting Director of the Experiment Station.  
 Cornelius Betten, Ph.D., Secretary, Professor in charge of Summer Session in College of Agriculture.

## STAFF OF INSTRUCTION

Arthur Augustus Allen, Ph.D., Assistant Professor of Ornithology. Ornithology  
 F. E. Andrews, Foreman of Instruction Flocks in Poultry Husbandry. Poultry Husbandry  
 Thomas Alexander Baker, B.S., Instructor in Animal Husbandry. Animal Husbandry  
 Elmer Eugene Barker, A.B., Ph.D., Assistant Professor of Plant Breeding. Plant Breeding  
 Earl Whitney Benjamin, Ph.D., Assistant Professor of Poultry Husbandry. Poultry Husbandry  
 Arthur Merle Besemer, B.S., Instructor in Dairy Industry. Bacteriology  
 Beulah Blackmore, B.A., Assistant Professor of Home Economics. Home Economics  
 Harold Eugene Botsford, Instructor in Poultry Husbandry. Poultry Husbandry  
 Lucile Brewer, B.S., Assistant Professor in Home Economics. Home Economics  
 H. P. Buchan, Foreman Incubation and Brooding. Poultry Husbandry  
 Harry Oliver Buckman, Ph.D., Asst. Professor of Soil Technology. Soils  
 Helen Canon, Instructor in Home Economics. Home Economics  
 Mrs. Anna Botsford Comstock, B.S., Assistant Professor of Nature-Study. Nature-Study  
 George Walter Cavanaugh, B.S., Professor of Chemistry in its Relations to Agriculture. Chemistry  
 Ralph Wright Curtis, M.S.A., Professor of Landscape Art. Landscape Art  
 Archie Byron Dann, B.S., Instructor in Poultry Husbandry. Poultry Husbandry  
 George Charles Embody, Ph.D., Assistant Professor of Aquiculture. Natural History  
 J. H. Paull, Ph.D., Professor of Botany in University of Toronto. Botany  
 S. W. Frost, B.S., Assistant in Entomology. Entomology  
 Julia Gleason, B.S., Instructor in Home Economics. Home Economics  
 L. A. Hausman, M.A., Instructor in Meteorology. Meteorology  
 Arthur John Heinicke, Ph.D., Instructor in Pomology. Pomology  
 H. S. Jackson, A.M., Professor of Plant Pathology. Plant Pathology  
 Oskar Augustus Johannsen, Ph.D., Professor General Biology. Biology  
 Olney Brown Kent, B.S., Instructor in Poultry Husbandry. Poultry Husbandry  
 Adele Koch, B.S., Assistant in Home Economics. Home Economics  
 Charles Ralph Kopman, Assistant in Poultry Husbandry. Poultry Husbandry  
 George Nieman Lauman, B.S.A., Professor of Rural Economy. Rural Economy  
 David Lumsden, Assistant Professor of Floriculture. Floriculture  
 William F. Lusk, M.S.A., Professor of Agricultural Education, University of Minnesota. Rural Education  
 Lawrence Howland MacDaniels, A.B., Instructor in Botany. Botany  
 DeVoe Meade, B.S., Instructor in Animal Husbandry. Animal Husbandry  
 Winifred Moses, B.S., Instructor in Home Economics. Home Economics  
 Juan Estevan Reyna, E.E., Instructor in Drawing. Drawing  
 Frank Elmore Rice, Ph.D., Assistant Professor in Agricultural Chemistry. Chemistry  
 Flora Rose, M.A., Professor of Home Economics. Home Economics  
 Henry William Schneck, B.S., M.S., Instructor in Vegetable Gardening. Vegetable Gardening



Susan Bender Sipe, J. O. Wilson Normal School, Washington, D. C.	Rural Education
Anna C. Stryke, A.B., Instructor in Entomology.	Entomology
George Cornell Supplee, M.S.A., Instructor in Dairy Industry.	Bacteriology
Clark Leonard Thayer, B.Sc., Instructor in Floriculture.	Floriculture
Edward Mowbray Tuttle, A.B., Assistant Professor of Rural Education	Rural Education
Martha Van Rensselaer, A.B., Professor of Home Economics.	Home Economics
Karl McKay Wiegand, Ph.D., Professor of Botany.	Botany
B. P. Young, A.M., Instructor in Entomology.	Entomology

## **COURSES IN THE COLLEGE OF AGRICULTURE**

The New York State College of Agriculture provides the following courses of instruction under the rules and regulations that follow:

1. **Admission.** The summer school in the College of Agriculture is especially designed to meet the needs of persons who are engaged in educational work. Teachers, supervisors, superintendents, extension workers, and others concerned with activities of an educational nature will be admitted regardless of previous academic preparation, others will be admitted only on the submission of evidence of having satisfactorily completed at least two years of work in Cornell University or some other institution of equal standing. Students must also conform to the regulations regarding attendance and registration on page 7 of this announcement.

Applicants for admission should send evidence of meeting these requirements to the Secretary of the College of Agriculture in advance of registration. The submission of this evidence will not constitute an obligation to attend but it is suggested as a means of avoiding delay at the time of registration.

2. **Tuition and Fees.** Tuition in any of the courses following is free to admitted students who are residents of New York State. Others will pay a tuition fee of \$30 whether one subject or more is taken. For the time and place of payment, see page 7.

In some of the courses a fee to cover the cost of materials used will be charged.

Fee cards must be procured from the instructor at the first exercise, and returned to him receipted within five days.

3. **Academic Credit for Work.** For the requirements for the degree B.S. (eight terms, 120 hours, etc.) see the Announcement of the College of Agriculture.

## **ANIMAL HUSBANDRY**

**A. Principles and Practice of Feeding Animals.** Credit two hours. Lectures, M W F, 10. Practice, T Th, 10-12:30. Animal Husbandry Building. Mr. BAKER.

The general principles of animal nutrition, based on Jordan's Principles of Human Nutrition as a text. The discussion of these principles will occupy most of the time given to lectures. The practice of feeding animals, based on Henry's Feeds and Feeding as a text. The discussion of the practice of feeding horses, cattle, sheep and swine will occupy most of the time given to laboratory work, which will also include the study of feeding standards, the study of about forty home-grown and commercial feeds, the formulation of rations, and the like.

**B. Principles of Animal Breeding, and Elementary Judging.** Credit, three hours. Lectures, daily except S, 9. Laboratory T Th, 2-4:30. Animal Husbandry Building. Mr. MRADE.

A general discussion of the principles of heredity as applied to the breeding of animals, with a study of animal form; origin and formation of breeds; crossing and grading, with an outline of the methods of registration and the study of records and pedigrees. Demonstrations, essays, and reports will be required in addition to the lectures.



The laboratory work will include practical handling of animals and methods of scoring and judging. Types and several breeds, particularly of dairy cattle, will be illustrated.

### BACTERIOLOGY

**A. Bacteriology.** Credit, two hours. Lectures T Th, 9, Dairy Building 222. Laboratory M W F, 2-5, Dairy Building 122. Mr. SUPPLEE and Mr. BESEMER.

A general course in bacteriology covering the general characteristics of bacteria, methods of study and their relation to the sanitary and economic phases of agriculture. It is especially designed for teachers of agriculture, botany, and biology. Laboratory fee, \$2.00.

### BIOLOGY

**A. General Biology.** Credit, three hours. Lectures daily except S, 11. Roberts Hall 392. Laboratory and field work, sec. A, M W F, 2-4:30, sec. B. T Th, 2-4:30, S, 8-10:30. Roberts Hall 203. Professor JOHANNSEN and Mr. \_\_\_\_\_.

This is an elementary course designed to acquaint the general student and the prospective teacher with the principal ideas of biology through selected practical studies of the phenomena on which biological principles are based. Laboratory fee, \$2.50.

**H. Aquiculture.** Credit, one hour. Lectures T Th, 9. Roberts Hall 392. Assistant Professor EMBODY.

A series of lectures relating to the propagation of fishes and other useful aquatic organisms, and the conservation of our aquatic resources.

### BOTANY

The courses in botany are planned to meet the needs of high school and college teachers, as well as to furnish information for persons not intending to teach.

The work will consist of lectures, laboratory work, and field work. The lecture and classroom work will be supplemented by lantern slides, charts, microscopes, slides, museum and herbarium material. It is likely that some round-table discussions will be arranged.

The region about Ithaca is especially rich in plant life. Rarely, if ever, is a locality found that is better adapted for summer field work in botany. The richness of the fungous and the algal floras, as well as the great number of mosses, liverworts, ferns and flowering plants, render field work here especially attractive and valuable. Special attention is given to the field botany, although other phases of the work are not ignored.

The country in the vicinity of the University is very diversified; marshes, fields woodlands, ravines, and bogs all being accessible for day trips. Many short field trips will be taken and three longer all-day trips. Each student in course A, B, D, E, H, I, and J is expected to take at least two of the three all-day trips. The all-day trips will occur on Saturdays and will entail an extra expense of 50 cents to \$1.50 for each; one of the trips will cost \$2.50.

Some of the excursions will be in rough and wild localities, and clothing suitable for such trips should be provided. Women are strongly advised to wear the bloomer costume, which, however, must be approved. During recent years this costume has been very generally worn for such work. For one trip indeed, which, however, is not definitely required, the bloomer costume is really a necessity.

**A. Elementary Botany.** Credit, three hours. Lectures, M W, 8. Laboratory, M W, 9-1, F, 8-1, with additional reading or field work. Botanical Laboratory, Agronomy Building. Professor FAULL and Mr. ———.

Representative plants from all the larger plant groups will be studied. Emphasis will be placed on structure and life history with particular attention to evolutionary relationship. Some attention will be given to the economic aspects of the different groups, and to their adaptation to surroundings. Field work will replace laboratory hours to a limited extent and some all-day trips will be required.

This is a general course planned as an introduction to the study of botany and as a preparation for advanced courses. It is intended also to cover certain phases of college entrance requirements and of general secondary school botany. Laboratory fee, \$3.50.

**B. Elementary Morphology of Seed Plants.** Credit, one hour. Lectures T, 2-3. Laboratory T, 3-5:30, Th, 2-4:30, with some additional reading. Botanical Laboratory, Agronomy Building, Professor FAULL and Mr. ———.

A study of the variation in form and structure of roots, stems, leaves, flowers, fruits, and seeds, together with the terminology concerned, and the advantages of these variations. Modified plant parts, pollination, and seed dissemination will receive attention. Fundamental internal structure will be briefly treated. Laboratory and field studies, conferences, recitations, and reading.

The course is arranged somewhat after the plan of Gray's Lessons in Botany, and is designed as a preparation for systematic field botany and for persons desiring a general knowledge of the common plants. It also covers certain phases of secondary school botany. Identification is not a feature of this course. Laboratory fee, \$2.

**D. Identification, Classification, and Ecology of the Higher Plants.** Credit, two hours. Prerequisite: some training in structural botany taken previously or in connection with this course. Lectures Th, 8. Laboratory or field, T, 8-1, Th, 9-1. Botanical Laboratory, Agronomy Building. Professor WIEGAND and Mr. METCALF.

A comprehensive study of the wild flora about Ithaca, with reference to the practical recognition of species and varieties as well as to the floral and foliar characteristics of these species and to the grouping of them into genera, families, and more comprehensive groups. The course consists of field and laboratory work, but is supplemented by general discussions and lectures on the broader questions of classification, nomenclature, distribution, and habitat. The ecological association and modifications of the various species and varieties will be noted. The course is intended to supply teachers and others with a general knowledge of the flora. Some all-day trips are required. Supplementary instruction will be given in the preservation of material for the museum and for the herbarium.



If necessary this course will be divided as follows: A. For those beginning this type of work. B. For students who already possess some knowledge of the flora. Laboratory fee, \$2.50.

E. **Trees and Shrubs.** Credit, two hours. Prerequisite: some training in structural botany, taken previously or in conjunction with this course. Lectures W, 2. Laboratory or field work M, 2-5, W, 3-5, F, 2-5. Agronomy Building. Mr. MACDANIELS.

A course intended for those who desire more concentrated work on the woody plants of our flora than can be obtained in course D. The aim is to familiarize the student with as many as possible of the trees and shrubs in the Cayuga Lake flora, their floral and foliar characters, their structure, methods of growth, habits, and distribution. Much of the work will be in the field, supplemented by laboratory practice, lectures, and demonstrations. Some all-day trips are required. Laboratory fee, \$2.50.

H. **Identification and Classification of Lichens, Liverworts, Mosses, and Ferns.** Credit, one hour. Prerequisite: a general knowledge of structural botany. Laboratory and field work, T Th, 2-5, with some additional work by appointment. Botanical Laboratory, Agronomy Building. Professor WIEGAND and Assistants.

An introduction to the four groups of plants indicated by the title of the course. The student will become acquainted with the general structural characteristics of different members of these groups, and will receive practice in tracing the various species through the keys. The field trip is planned to acquaint students with the flora of our ravines and swamps which is especially rich in lichens, liverworts, mosses, and ferns. Material will be collected, identified, mounted in standard packets and will become the property of the student. Some all-day trips are required. Laboratory fee, \$2.

(The following courses are given under the direction of the Department of Plant Pathology)

I. **Parasitic Fungi.** Credit, two hours. Prerequisite general introductory botany. Lectures M W, 8. Laboratory or field work M W, 9-1. Bailey Hall. Professor JACKSON.

This course is designed to cover the general field of parasitic fungi and related forms, especial emphasis being placed on collection and identification as well as upon disease producing characteristics. Teachers will find these courses in fungi helpful in providing facts and materials for use in their work. Fee \$3.

J. **Fleshy Fungi.** Credit, two hours. Prerequisite general introductory botany. Lecture F, 8. Laboratory or field work F, 9-1, 2-5:30, with some additional reading or field work. Bailey Hall. Professor JACKSON.

This course is planned to give a general knowledge of the so-called mushrooms, toadstools, and allied forms. Particular attention will be given to the collection, identification and classification of the species growing about Ithaca. Fee \$3.

## CHEMISTRY

A. **Agricultural Chemistry.** Credit, four hours. Prerequisite: Chemistry I, or its equivalent. Lectures, daily, 8. Recitations, M W F, 9. Professor CAVANAUGH.

A general course treating of the relations of chemistry to agriculture. The following are among the subjects discussed: the chemical composition of agricultural plants and plant by-products; the chemical composition of soils; some chemical relations between the organic and the inorganic matter of soils; sources, preparation and manufacture of the materials used in fertilizers; the chemical relations of lime to soils; the chemistry of insecticides and fungicides.

**B. Agricultural Chemistry.** Credit, two hours. Prerequisite Chemistry I and 6, or the equivalent. M W F, 11-1; 2-4:30. Assistant Professor RICE. Caldwell Hall 250.

A laboratory course designed to accompany course A.

**C. Household Chemistry.** Credit, two hours. Prerequisites: Chemistry I and 6, or the equivalent. Lectures, daily except S, 10. Professor CAVANAUGH.

This course is designed especially for students in home economics. It treats of the chemistry of foods, beverages, baking chemicals, preservatives, and detergents.

**D. Household Chemistry.** Credit, two hours. M W F, 11-1; 2-4:30. Assistant Professor RICE. Caldwell Hall 250.

A laboratory course designed to accompany course C.

## DRAWING

**A. Mechanical Drawing.** Credit, two hours. Eighteen hours' work a week will be required for the course. Laboratory periods to be arranged before registration. Dairy Building 341. Mr. REYNA.

This course will include the following: 1, Inclined Gothic Lettering. A brief course, devoting special attention to the upper-case letters. 2, Orthographic Projection. A study of the principles with a few problems involving the more common applications. 3, Isometric Drawing; its derivation, application and limitations. Geometric and simple cabinet problems will be solved. 4, Mechanical Drawing; a consideration of the proper use of symbols, dimensions and sections as applied to simple problems. One complete mechanical drawing plate will be executed. 5, Farm Boundaries. One plate involving the use of the protractor in conjunction with traverse data. 6, House Planning. The student is familiarized with definitions and terms, and with the principles of interpretation of floor and roof plans and elevations, with simple applications including individual designs of a complete bungalow. One tracing will be made from each division. The proper use of drawing instruments, with emphasis on accuracy and neatness, is an essential feature of this course.

**B. Perspective Drawing.** Credit one hour. Nine hours actual work a week will be required for the course. Laboratory periods arranged by appointment. Dairy Building 341. Mr. REYNA.

Especially designed for elementary and high school teachers. In sketching a drawing on the blackboard by the teacher a knowledge of the laws that govern perspective is essential. This course aims to give the student a concise but thorough knowledge of these laws amply illustrated with the solution of practical school problems.



**ENTOMOLOGY**

**A. Insect Life.** Credit, two hours. Lectures, T Th, 8. Practical exercises T Th and F, 2-4:30. Roberts Hall 391. Miss STRYKE and ———.

This is a course especially designed for public school teachers. It will deal with the more interesting and important groups of insects. The practical exercises will be devoted to such work as may be done in any school with little equipment. The development and the activities of insects will be emphasized.

More advanced students in the summer session, who desire laboratory work of college grade, may register for one or both of the following courses which are equivalent to the long term courses.

**D. Elementary Morphology of Insects.** Credit, three hours. Laboratory open daily except S, 8-5. Twenty-one hours of laboratory work per week required Roberts Hall 391. MR. YOUNG and——

An introductory laboratory course required of all students who plan to do advanced work in entomology. Laboratory fee, \$2.

**F. Elementary Systematic Entomology.** Credit two hours. Fifteen hours of laboratory work per week required. Must be preceded or accompanied by course 4. Laboratory open daily except S, 8-5. Roberts Hall 391. Mr. YOUNG and——

Practice in the identification of insects, and in the method of phylogenetic study as illustrated by their wing venation. With course 4, required of all students who plan to do advanced work in entomology. Laboratory fee, \$3.

Members of the summer session may attend, in Roberts 392, Professor Needham's long-term course in the Ecology of Insects (Course 2: Lecture W, 8) or Professor Matheson's course in General Entomology (Course 3: Lecture W F, 9) without credit.

**FLORICULTURE**

**A. Garden Flowers.** Credit, one hour. Lectures, T Th, 8. Laboratory, F, 2-4:30. Greenhouses. Professor LUMSDEN and Mr. THAYER.

This is designed as an elementary course to be of value for home flower garden or school garden work. It is outlined so as to acquaint students with the most valuable material for this line of work, and to cover methods of propagation and culture.

**B. Indoor Flower Growing.** Credit, one hour. Lectures, M W, 10; Laboratory, W, 2-4:30. Greenhouses. Mr. THAYER.

The propagation and culture of plants suitable for winter gardens in school rooms, including a study of containers, soils, fertilizers, insecticides, is the basis of this course. The selection of varieties of bulbs and their methods of culture indoors is also considered, as is also the method of propagation and general care of species of plants suited for indoor culture.

**HOME ECONOMICS**

**A. Elementary Course in Foods.** Credit, four hours. Lectures and recitations daily except S, 12. Home Economics Building 245. Laboratory practice daily except S, 9-12 or 2-5. Home Economics Building 200. Miss MOSES and Miss KOCH.

A course for establishing a fundamental knowledge of foods. The lectures will include a discussion of the sources, composition, and characteristics of food-stuffs; principles governing the selection of foods and methods of preparing them; comparative nutritive values and cost of foods. The laboratory work will follow the lectures closely, and will consist of experiments in determining the characteristics of food-stuffs and practical problems in the preparation of food. The number registering for this course is limited to forty. Laboratory fee \$10.

**B. Advanced Course in Food Preparation.** Credit, two hours. Laboratory practice daily except S, 8-11. Home Economics Building 200. Miss BREWER.

A course in special methods in cooking. Open only to students having had Course A or its full equivalent. The number registering for this course is limited to twenty. Laboratory fee, \$10.

**C. 1. Human Nutrition.** Credit, three hours. Lectures and recitations, daily except S, 11. Home Economics Building 100. Laboratory practice, T Th, 2-5:30. Home Economics Building 200. Written reviews for those wishing credit in the course S, 11. Professor ROSE and Miss MOSES.

This course will include discussion of the fundamental principles of nutrition as these apply to the human being; the practical means of applying scientific principles in planning dietaries; special problems of nutrition, as the feeding of infants and children. The laboratory work will consist of exercises in estimating the comparative cost and nutritive value of various foods; in planning and judging various types of dietaries; in preparing typical meals. Open only to students who have had course A or its equivalent. Laboratory fee, \$7.50.

**D. Household Management.** Credit, two hours. Lectures, daily except S, 8. Home Economics Building 100. Written reviews for those desiring credit in the course S, 8. Professor VAN RENSSELAER and Miss —

The lectures will discuss division of income, household expenses, factors in cost of living from the housekeeper's standpoint, domestic service, household equipment, means for saving labor and general management of the house.

**E. 1. Extension in Home Economics.** Credit, three hours. Practice daily except S, 2-5, and conferences to be arranged. Home Economics Building 265. Professor VAN RENSSELAER and Miss BREWER. Laboratory fee, \$5.00. In addition there will be the expense of travel to nearby places.

The course embraces a discussion of the history of Home Economics extension, legislation, practice with criticism in presentation of subject matter and demonstrations; office detail in extension enterprises. Practice in the field will be offered to those who are qualified for extension work. To others opportunity will be given for observation.

This course is offered to meet a growing need for trained extension workers. It is planned especially for those persons who already have knowledge of home economics subjects to extend, and who wish to familiarize themselves with channels through which extension work may be carried and with methods of extension teaching. Persons having had previous training in home economics may find it an advantage, however, to take courses in home economics as a review of subject matter.

Other persons may be admitted to this course if they can show special qualifications which will adapt them to extension work. Such students must choose



some special subject-matter courses in home economics to be taken simultaneously with Course E.

The following combinations are suggested to constitute a full program: Extension in Home Economics, foods, household management. Extension in Home Economics, nutrition (for those eligible), household management: Extension in Home Economics, foods (lectures), nutrition (lectures). Extension in Home Economics, sewing, foods (lectures). Extension in Home Economics, sewing, household management. Extension in Home Economics, sewing, nutrition (lectures).

Information regarding courses in Home Economics may be obtained by addressing the Department of Home Economics.

**E. 2. Organization of Extension Material.** Credit, two hours. Lectures daily except S, 12. Miss CANON.

This course is planned to give training in the organization and presentation of material used in extension work. It will include the making of outlines for demonstrations, lectures, and bulletins; the making of projects; correspondence; methods of filing; the preparation of record blanks for office work; the preparation of material for the press; and the elements of proof-reading.

**G. Elementary Clothing and Handwork.** Credit, two hours. Practice daily except S, 8-11 or 2-5. Home Economics Building 300. Miss BLACKMORE and Miss GLEASON.

The course includes consideration of the following subjects; the use and care of the sewing machine; making of stitches by machine and by hand; elementary drafting and adaption of patterns; cutting, fitting, and finishing simple undergarments; knitting, crocheting, and simple embroidery. Students provide all material, subject to the approval of the instructor. The number in this class is limited to thirty-six. Estimated expenses, from \$5 to \$10. Laboratory fee, \$3.00

**H. Draping, Drafting, and Elementary Dressmaking.** Credit, two hours. Prerequisite course G. Practice daily except S, 2-5. Home Economics Building 300. Miss BLACKMORE.

Practice given in drafting, cutting, fitting, and designing of patterns. All foundation patterns are drafted to measure and fitted. Drafting of a tight fitting lining, draping of a fitted lining, and draping of original and copied designs in cheesecloth and other suitable materials. Elementary directions given for adjusting patterns to normal and abnormal figures. Making of a few simple models and of an unlined lingerie dress. The number registering for this course is limited to eighteen. Students provide all materials. Estimated expense, \$8. Expense for dress form, \$4. Laboratory fee, \$4.00.

**I. Dressmaking.** Credit, two hours. Prerequisite courses G & H. Practice daily except S, 8-11. Home Economics Building 300. Miss BLACKMORE.

This course includes the cutting and making of a tailored silk shirt waist, a lingerie dress, and an unlined silk or wool dress. One garment is drafted or modeled. The work consists in demonstrations, discussions, and practice. The economical purchase of a wardrobe will be considered; also a comparison of commercial products with those made by hand, hygienic factors involved in clothing, and the economic and sociological phases of the clothing industry. The

number registering for this course is limited to eighteen. Students provide all material, subject to the approval of the instructor. Estimated expense, from \$15 to \$20. Laboratory fee, \$3.00.

### LANDSCAPE ART

C. **The Arrangement and Planting of Home and School Grounds.** Credit, one hour. Lecture, F, 8. Laboratory, T Th, 2-4:30. Landscape Art Building. Professor CURTIS.

An introductory course consisting of illustrated lectures to explain some fundamental principles and of field trips to identify and explain the use of important landscape plants. The purpose of this course is to give the students a point of view in landscape work and, in addition, to offer some specific suggestions for the solution of simple problems.

### METEOROLOGY

A. **Meteorology and Climatology.** Credit, one hour. Lectures M W. 9. Laboratory period by appointment. Mr. HAUSMAN. Room 107, Rockefeller Hall. (For all arrangements for the course report at Room 107 at first lecture period).

This course is adapted to the needs of teachers of those subjects in which weather and climate are important factors, particularly for teachers of physical geography and allied subjects. It is designed to acquaint the student with the general and secondary circulation of the atmosphere, and with the development, progression, and conditions that attend cyclones, tornadoes, hurricanes, and other special phenomena.

The laboratory practice consists of a systematic study of the principal weather and climatic elements, with the aid of maps, charts, and instruments. Attention is also given to the study of the progression of the seasons.

### NATURE-STUDY

A. **General Nature-Study.** Credit, two hours. Lectures, M W F, 10. Field and laboratory observations, T Th, 10-12:30. Roberts Hall 302. Assistant Professors COMSTOCK and EMBODY.

The object of this course is to train teachers in making personal observations along several lines of nature-study and to give them a foundation for carrying on the work independently. As many as possible of the laboratory periods will be spent in the fields in the study of birds, trees, and plants. Special attention will be given to observing the relation of insects to flowers of field and garden. The lectures will supplement the field and laboratory work, and will also present practical methods for conducting nature-study in the grades, including plans for breeding cages and aquaria; and one lecture will be given each week on nature literature.

B. **Natural History of the Farm.** Credit, one hour. Lectures M, 8. Roberts Hall 392. Field work, sec. A, T Th, 2-5; sec. B, W F, 2-5. Assistant Professor EMBODY.

This is primarily a field course, treating of the wild inhabitants of the fields, woods, marshes, and streams of the farm. Wild organisms will be compared with



domesticated ones, and the availability of certain wild forms for cultivation will be pointed out.

The following topics, among others, will be studied: wild fruits, wild roots, wild cereals, deciduous trees, evergreens, pasture plants and their fitness for pasture conditions, wild birds, wild mammals, and fishes and other inhabitants of the farm stream.

Each student will be required to do a considerable part of the work individually. Field reports must be handed in weekly and these will be carefully graded. Laboratory fee, \$1.

**C. Seminary in Kindergarten Methods in Nature-Study.** M, 2. Insectary.

Intended primarily for those taking course A above. A conference on methods of presenting nature-study materials to small children. Assistant Professor COMSTOCK.

**D. Advanced Nature-Study.** Credit, one hour. Lecture W, 12. Insectary.

Laboratory and field periods by appointment. Only those who have had course A are eligible.

ORNITHOLOGY

**B. Ornithology.** Credit, three hours for lectures, and two laboratory and two field periods of two and one-half hours each. Lectures, T Th, 11, McGraw Hall, Room 5. Laboratory is open, daily except Sat, 2-5. Field work in two sections. The lectures may be taken separately or any combination may be made according to the needs of the student. Laboratory fee, \$1.50. Assistant Professor ALLEN.

A course concerned with the various phases of bird life. The lectures will discuss such subjects as migration, coloration, molt, habits, nests, eggs, care of young, structure and toponomy, flight, general bird-ecology and ecological groups, bird photography, preparation of study material, economic importance, methods of attracting birds, and geographical distribution. The aim of the field work is the identification of birds in their haunts and observations upon habits. Representatives of the important families of North American birds will be studied in the laboratory with the aid of a manual. Each student should be provided with Chapman's Handbook of Birds of Eastern North America and with field or opera glasses.

**C. Economic Ornithology and Mammalogy.** Credit, two hours. Should be preceded by course B; presupposes elementary knowledge of botany and entomology. Lectures M W, 11. McGraw Hall 5. Laboratory and field work, T Th, 2-5. Assistant Professor ALLEN.

This course is designed to assist those planning professional work with birds or mammals. The lectures will take up the various phases of bird and mammal life in relation to agriculture with the methods of increasing beneficial species and destroying vermin; together with the elements of game breeding and fur farming. The laboratory will give practice in the identification of the food of birds, the preparation of material, and the making of skins. The field work will give opportunity for observation of feeding habits, field collecting, methods of attracting birds, and natural history photography.

**PHYSICAL TRAINING**

The new requirements regarding the teaching of physical training has created a demand for supervisors of this work. In addition, it has made it desirable for the teacher to have some preparation for the subject. The College has planned to meet both of these needs. The following course is designed for the teachers, and several courses have been planned for supervisors. Mr. Daniel Chase, assistant supervisor of the work for the state will be at the College to assist with the work during a part of the session. Those desiring to prepare for supervisory positions may secure detailed information by application to Professor Cornelius Betten, College of Agriculture, Ithaca, N. Y.

**A. General Course in Physical Training.** Credit, two hours. Daily except S at 8. Gymnasium. Mr. HILL and others.

This is an elementary course designed to assist the teacher of the country school in carrying out proper work in physical training. The lectures and exercises will be planned to familiarize the teacher with the purpose of the work and proper methods of handling it.

**PLANT BREEDING**

**A. Principles and Practice of Plant Improvement.** Credit, one hour. Lectures, T Th, 8. Laboratory and field practice, T, 2-4:30. Forestry Building 210. Assistant Professor BARKER.

This is an elementary course designed primarily for teachers, and persons interested in a general way in plant genetics. The laws underlying plant breeding, variation, hereditary and general evolution will be considered carefully. Ample opportunity will be given for making hybrids, collecting specimens of variations in wild and cultivated plants, and similar exercises. Laboratory fee, 50 cents.

**POMOLOGY**

**A. General Fruit Growing.** Credit, three hours. Prerequisites Botany I or its equivalent. Lectures and recitations daily at 11. Roberts Hall 292. Laboratory, M W, 2-4:30. Roberts Hall 202. Mr. HEINICKE.

A study of the methods of propagation and early care of commercial fruits, including the growing of seedlings, cuttings, and layers; principles of budding, grafting, pruning, and planting; soils, varieties, and planting plans for the orchard; cover crops, cultivation, fertilization, spraying, pruning and thinning, as practiced in orchard management; picking, grading, packing, storing, and marketing of fruit. This course considers the apple, pear, quince, cherry, plum, apricot, peach, nuts, and small fruits.

**B. Advanced Pomology.** No credit toward graduation. Prerequisites: Botany I and Pomology A, or the equivalent. Lectures T Th S, 9. Roberts Hall 292. Mr. CARRICK.

This course includes a comprehensive study of varieties and judging of fruits and a study of the characters and botanical relationships of the fruits of the United States. Each student is required to collect and mount a number of varieties and species. A trip to Geneva will occupy one afternoon or a Saturday sometime during the course.



## POULTRY HUSBANDRY

**A. The Care and Management of Poultry.** Credit, four hours. Lectures daily, 9, Poultry Building 375. Laboratory T Th F, 2-4:30, Poultry Building 300. Assistant Professor BENJAMIN and Mr. BOTSFORD.

Designed primarily for teachers of agricultural High Schools and other secondary agricultural schools. The course consists of 36 lectures and preliminary examinations, and 18 laboratory practice periods as they would be taught in one term of High School, and includes a general discussion and practical application of the principles of incubation; brooding; rearing; feeding; breeding for constitutional vigor, egg production, and fancy; marketing; housing; and general poultry farm management. Laboratory fee \$3.

**B. Farm Poultry.** Credit, one hour. Lectures, M W, 10, Poultry Building 375. Laboratory Th, 2-4:30, Poultry Building 300. Assistant Professor BENJAMIN and Mr. BOTSFORD.

An abbreviated course dealing with the most important principles of Poultry Husbandry and their application on the farm. Laboratory fee \$1.

**C. Feeding Practice.** Credit, one hour. Must be accompanied by course A or B. Practice three 30 minute periods per day, including Sunday for six weeks; morning 7:30-8:15; noon 12:45-1:30; night 4:30-5:00. Poultry Building. Mr. KENT, Mr. ANDREWS.

Practice in feeding for egg production and for fattening; includes preparation for market, record-keeping, and general care and management of fowls. Assigned reading and a written examination will be required. Laboratory fee \$1.

**D. Incubating Practice.** Credit, one-half hour. Must be accompanied by course A or B. Practice three 30 minute periods per day, including Sunday for three weeks; morning 7:30-8:15; noon 12:45-1:30; night 4:30-5:00. Poultry Buildings. Mr. KENT and Mr. BUCHAN.

Practice in operating incubators; disinfecting, keeping record testing eggs, and general management of the hatch. Assigned reading and a written examination will be required. Laboratory fee \$1.

**E. Brooding Practice.** Credit, one-half hour. Must be accompanied by course A or B. Practice three 30 minute periods a day, including Sunday, for three weeks; mornings 7:30-8:15; noon 12:45-1:30; night 4:30-5:00. Poultry Buildings. Mr. KENT and Mr. BUCHAN.

Practice in feeding, brooding, and caring for young chicks; keeping of temperature, food and growth records. Assigned reading and a written examination will be required. Laboratory fee \$1.

## RURAL ECONOMY

**A. American Agricultural Problems.** Credit, two hours. Prerequisite: Political Science 51 or its equivalent, or the special permission of the Department. Lectures, required reading and reports, daily except S, 10. Home Economics 370. Professor LAUMAN.

The problems studied will be those of land distribution, tenure and colonization; tenancy; rural credits; cooperation; marketing; and social development.

**B. The Cost of Living and Agriculture.** Credit, two hours. Prerequisite Political Science 51, or its equivalent, or the special permission of the Department.

Lectures, required reading and reports, daily except S, 12. *Home Economics* 370. Professor LAUMAN.

An analysis of the cost of living with special reference to the food problem and the relation of American agriculture to the resultant questions.

### RURAL EDUCATION

**B. Agriculture in the High School.** Credit, three hours. Lectures and discussions, daily 8. Caldwell Hall 282. Laboratory M W, 2-4:30, repeated T Th, 2-4:30. Professor LUSK.

A course for consideration of curricula, courses of study, school plot, home project, extension work and the preparation of material, as they relate to secondary school conditions. The work will be planned for those who have had technical preparation in agriculture. Lectures may be taken without laboratory work by special permission.

**F. The School.** Credit two hours or lectures only one hour. Lectures, M W F, 9; repeated M W F, 11. Laboratory M W, 2:00-4:30; repeated T Th, 2:00-4:30. Farm Management Building. Assistant Professor TUTTLE.

This is a fundamental course for rural teachers, training class teachers, district superintendents, and others concerned with elementary rural education. It is based upon the activities developed in the Cornell Rural School Leaflet which follows the State Syllabus, and is concerned with the place and use in country teaching of nature-study or the child's relation to his environment. It includes a consideration of such phases of the work as natural history; agriculture; home making; collections and exhibits; field trips; school apparatus; neighborhood studies; the school and the home; the school library; the school grounds; the school building; recreation; singing; dramatics; gardening in education; Arbor Day; Corn Day; Farmers' Week; junior project work; and similar topics.

**G. School and Home Gardens.** Credit, one hour. Lectures and discussions T Th, 11. Practice period, M, 2-4:30. Caldwell Hall 282. Miss SIPE.

This course will emphasize the educational value of gardens, their relation to other departments of school activities; the garden as a laboratory for nature study; class management; vacation gardens; supervision of school and home gardens, and the many problems that arise in the establishment and management of children's gardens.

Teachers planning to teach elementary agriculture and school gardening or those entering upon supervisory work will find it a practical course. Weekly conferences will be held for the discussion of individual problems.

This course is open only to students who are taking Course A in the department of Vegetable Gardening. Those registering for it are also required to take Course C in Soil Technology, and Course A in Floriculture.

Miss Sipe will be in room 282 in Caldwell Hall during registration days to advise with students.

Those desiring further information in advance of the opening of the summer school may write to Professor Geo. A. Works, College of Agriculture, Ithaca, N. Y.



## SOIL TECHNOLOGY

C. Soils. Three periods. Credit, one hour. Lectures, T Th, 10. Laboratory and demonstrations, T, 2-4:30. Caldwell Hall 143. Assistant Professor BUCKMAN.

! This course is not open to regular students in the college nor will students taking this course be permitted to apply it toward credit on any regular course of the department. It is designed primarily for students taking gardening and others must obtain permission before registering.

A practical, fundamental course in soils. The subject will be handled with special reference to the needs of those expecting to teach soils in secondary schools. The lectures will include a discussion of the formation and classification of soils, tilth, soil moisture, soil biology, soil amendments, manures and fertilizers, and practical soil management. The laboratory once a week will give opportunity for questions and practical discussions.

## VEGETABLE GARDENING

A. Vegetable Gardening. Credit, two hours. Lectures, M F, 8, T W Th, 9. Poultry Building 325. Laboratory, M F, 9-12, Vegetable Gardens, East Ithaca. Mr. SCHNECK and others.

This course is planned primarily to meet the requirements of those interested in school and social service work in vegetable gardening, as well as of the amateur gardener.

The location, planning, and management of a garden; seed and seed handling; growing early plants; special requirements of the various vegetable crops; and insects and diseases will receive consideration.

The laboratory work includes actual practice in the garden. Each student is assigned a plot on which he will plant and care for throughout the course the vegetables which are best suited for amateur gardens.

Laboratory fee, \$2.00.





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The Annual Register (for the year 1916-17, published January 1, 1917), price 50 cents.

Book of Views, price 25 cents.

Directory of Faculty and Students, Second Term, 1916-17, price ten cents, and the following informational publications, any one of which will be sent gratis and post-free on request. The date of the last edition of each is given after the title.

General Circular of Information for Prospective Students, December 15, 1916.

Announcement of the College of Arts and Sciences, April 15, 1916.

Announcement of Sibley College of Mechanical Engineering and the Mechanic Arts, January 15, 1917.

Announcement of the College of Civil Engineering, March 15, 1916.

Announcement of the College of Law, May 15, 1916.

Announcement of the College of Architecture, July 1, 1916.

Announcement of the New York State College of Agriculture, June 1, 1916.

Announcement of the Winter Courses in the College of Agriculture, June 15, 1916.

Announcement of the Summer Term in Agriculture, April 1, 1916.

Announcement of the New York State Veterinary College, May 1, 1916.

Announcement of the Graduate School, February 15, 1917.

Announcement of the Summer Session, March 1, 1917.

Annual Report of the President, September 1, 1916.

Pamphlets on prizes, samples of entrance and scholarship examination papers, special departmental announcements, etc.

Announcement of the Medical College may be procured by writing to the Cornell University Medical College, Ithaca, N. Y.